



## ODP Approach for Blended Learning



## Table of Contents

<b>1.0</b>	<b>BLENDED LEARNING STRATEGY.....</b>	<b>1</b>
1.1	INTRODUCTION .....	1
1.2	BACKGROUND.....	1
1.3	PURPOSE AND SCOPE.....	3
1.4	TARGET AUDIENCE .....	3
1.5	STRATEGY FOR BLENDED LEARNING.....	4
1.5.1	<i>Overview</i> .....	4
1.5.2	<i>Considerations</i> .....	5
1.6	APPLYING THE ADDIE MODEL .....	10
1.6.1	<i>Analysis</i> .....	10
1.6.2	<i>Design</i> .....	22
1.6.3	<i>Development</i> .....	24
1.6.4	<i>Implementation</i> .....	24
1.6.5	<i>Evaluation</i> .....	24
<b>2.0</b>	<b>DELIVERY METHODS ANALYSIS TOOL (DMAT).....</b>	<b>26</b>
2.1	OVERVIEW.....	26
2.2	PURPOSE.....	26
2.3	TRAINING DELIVERY STRATEGY TOOL .....	26
2.3.1	<i>Audience Composition</i> .....	26
2.3.2	<i>Course Goals and Objectives</i> .....	28
2.3.3	<i>Course Modules</i> .....	29
2.3.4	<i>Content Allocation and Course Compression</i> .....	30
2.3.5	<i>Course Prerequisites</i> .....	31
2.3.6	<i>Course Participant Preparation</i> .....	32
2.3.7	<i>Course Follow-up</i> .....	32
2.3.8	<i>Course Assessment: Evaluation</i> .....	33
2.4	MEDIA AND TECHNOLOGY SELECTION TOOL .....	34
2.4.1	<i>Decision Tree Process of Media Selection</i> .....	34
2.4.2	<i>Media and Technology Considerations</i> .....	35
2.4.3	<i>Summary Results</i> .....	44
2.4.4	<i>Additional References</i> .....	46
2.4.5	<i>Conclusion</i> .....	46
<b>3.0</b>	<b>WEB-BASED TRAINING STYLE GUIDE.....</b>	<b>47</b>
3.1	INTRODUCTION .....	47
3.1.1	<i>Purpose</i> .....	47
3.1.2	<i>Audience</i> .....	47
3.1.3	<i>Structure</i> .....	47
3.2	OVERVIEW OF THE WEB-BASED COURSE DEVELOPMENT PROCESS .....	47
3.2.1	<i>What is Web-based Training?</i> .....	47
3.2.2	<i>The Instructional Systems Design Process</i> .....	48
3.3	DESIGN STRATEGIES AND BEST PRACTICES.....	50
3.3.1	<i>Overview</i> .....	50
3.3.2	<i>Needs Analysis</i> .....	50
3.3.3	<i>Web-based Training Objectives</i> .....	53
3.3.4	<i>Instructional Strategies</i> .....	56

3.3.5	<i>Interactivity</i> .....	60
3.3.6	<i>Learning Assessments</i> .....	63
3.4	DEVELOPMENT STRATEGIES AND BEST PRACTICES .....	68
3.4.1	<i>Overview</i> .....	68
3.4.2	<i>Course User Interface Design Specifications</i> .....	68
3.4.3	<i>General Screen Development Standards</i> .....	75
3.4.4	<i>Graphics Development</i> .....	81
3.4.5	<i>Animation</i> .....	82
3.4.6	<i>Digital Audio</i> .....	83
3.4.7	<i>Digital Video</i> .....	84
3.4.8	<i>Streaming Media</i> .....	86
3.4.9	<i>Programming</i> .....	88
3.4.10	<i>Configuration Management</i> .....	89
3.4.11	<i>Accessibility Compliance (Section 508)</i> .....	89
3.5	DELIVERY ENVIRONMENT STRATEGIES AND BEST PRACTICES.....	90
3.5.1	<i>Overview</i> .....	90
3.5.2	<i>Interoperability and Accessibility Standards</i> .....	90
3.5.3	<i>Content Delivery Systems</i> .....	92
3.5.4	<i>End-User Platform Considerations</i> .....	93
3.6	PROCESS AND BEST PRACTICES.....	95
3.6.1	<i>Overview</i> .....	95
3.6.2	<i>The Process</i> .....	95
<b>4.0</b>	<b>BLS IMPLEMENTATION: BLENDED LEARNING PANEL.....</b>	<b>108</b>
4.1	OVERVIEW.....	108
4.2	PURPOSE.....	108
4.3	BLENDED LEARNING PANEL .....	108
4.4	MEMBERSHIP .....	109
4.4.1	<i>Roles and Responsibilities</i> .....	111
4.4.2	<i>Metrics</i> .....	111
4.4.3	<i>Near-term Concept of Operation</i> .....	112
4.4.4	<i>Near-term Focus – Blended Learning Guidelines</i> .....	112
4.4.5	<i>Core Processes</i> .....	113
4.4.6	<i>Additional Considerations</i> .....	114
4.4.7	<i>Long-term Concept of Operation</i> .....	115
4.5	TRANSITION AND CHANGE MANAGEMENT STEPS.....	117
4.5.1	<i>Objectives</i> .....	117
4.5.2	<i>Implementation Roadmap</i> .....	117

## Figures

FIGURE 1. SUMMARY OF TASKS ACCOMMODATED BY ODP TRAINING.....	2
FIGURE 2. PERFORMANCE IMPACT OF A BLENDED LEARNING STRATEGY .....	3
FIGURE 3. BASELINE STRATEGY FOR BLENDED LEARNING.....	5
FIGURE 4. THE ADDIE MODEL OF INSTRUCTIONAL DESIGN.....	9
FIGURE 5. SAMPLE TASK ANALYSIS .....	11
FIGURE 6. SAMPLE TASK ANALYSIS .....	53
FIGURE 7. WBT LEARNING TAXONOMY.....	57
FIGURE 8. COURSE PROGRESSION .....	59
FIGURE 9. COURSE MAIN MENU - SAMPLE .....	69
FIGURE 10. TOPIC MENU (CLOSED) - SAMPLE .....	70
FIGURE 11. TOPIC MENU (OPEN) - SAMPLE .....	70
FIGURE 12. INTERFACE ELEMENTS .....	73
FIGURE 13. PORTRAIT STORYBOARD EXAMPLE.....	99
FIGURE 14. LANDSCAPE STORYBOARD EXAMPLE .....	100
FIGURE 15. FULL SCREEN STORYBOARD EXAMPLE.....	101
FIGURE 16. SCREEN CREATED BASED ON THE COMPLETED STORYBOARD (PORTRAIT) ...	105
FIGURE 17. SCREEN CREATED BASED ON THE COMPLETED STORYBOARD (LANDSCAPE)	106
FIGURE 18. SCREEN CREATED BASED ON THE COMPLETED STORYBOARD (FULL SCREEN)	106
.....	106
FIGURE 19. FUNCTIONAL ROLES AND RESPONSIBILITIES .....	111
FIGURE 20. BLENDED LEARNING GUIDELINES CRITICAL PATH (NEAR-TERM).....	112
FIGURE 21. PANEL CORE PROCESSES .....	113
FIGURE 22. BLENDED LEARNING GUIDELINES CRITICAL PATH (LONG-TERM) .....	115
FIGURE 23. FUTURE TRAINING DEVELOPMENT STATE .....	115
FIGURE 24. CHANGE MANAGEMENT ROADMAP .....	117

## Tables

TABLE 1. DELIVERY TECHNOLOGIES .....	13
TABLE 2. SUPPORT TECHNOLOGIES .....	14
TABLE 3. EXAMPLES AND NON-EXAMPLES OF WBT OBJECTIVES .....	56
TABLE 4. INSTRUCTIONAL STRATEGY EXAMPLES .....	60
TABLE 5. INTERACTIVITY STRATEGY LEVELS .....	60
TABLE 6. LEVEL OF OBJECTIVE AND RECOMMENDED INTERACTIVITY LEVEL .....	61
TABLE 7. GUIDELINES FOR INTERACTIVITY.....	62
TABLE 8. COST PER INTERACTIVITY LEVEL .....	63
TABLE 9. INTERFACE SPECIFICATIONS .....	71
TABLE 10. MEDIA TYPES .....	76
TABLE 11. COMMON ENCODING BIT RATES .....	86

## Appendices

DOCUMENTATION TEMPLATES .....	APPENDIX A
STORYBOARD TEMPLATES .....	APPENDIX B
PROCESS CHECKLISTS .....	APPENDIX C
GLOSSARY .....	APPENDIX D

## 1.0 Blended Learning Strategy

### 1.1 Introduction

Since 1998, the Office for Domestic Preparedness (ODP), as part of the Department of Justice, has been mandated to enhance state and local capabilities to respond to Weapons of Mass Destruction (WMD) terrorism. To meet this mandate, the *ODP Training Strategy* was developed through the combined efforts of ODP, the National Domestic Preparedness Consortium (NDPC), and other federal, state, and local entities.

State and local authorities have long relied on established approaches (such as classroom instruction and practical exercises) to train First Responders. However, as the threat of domestic terrorism increases and the demands on Responders intensify, a more distributed and flexible training model is needed to guide future efforts. The training model must be agile enough to address dynamic requirements quickly, and robust enough to reach a large, diverse, growing audience.

For these reasons, ODP is pursuing a "Blended Learning" approach to provide modular training content in a variety of mediums (including, but not limited to, traditional, Web-based, computer-based, and Video Teletraining) to keep pace with current needs. By balancing the technological advances in Distributed Learning with traditional training methods, Blended Learning will improve support for First Responders in a number of ways as illustrated in Section 1.2.

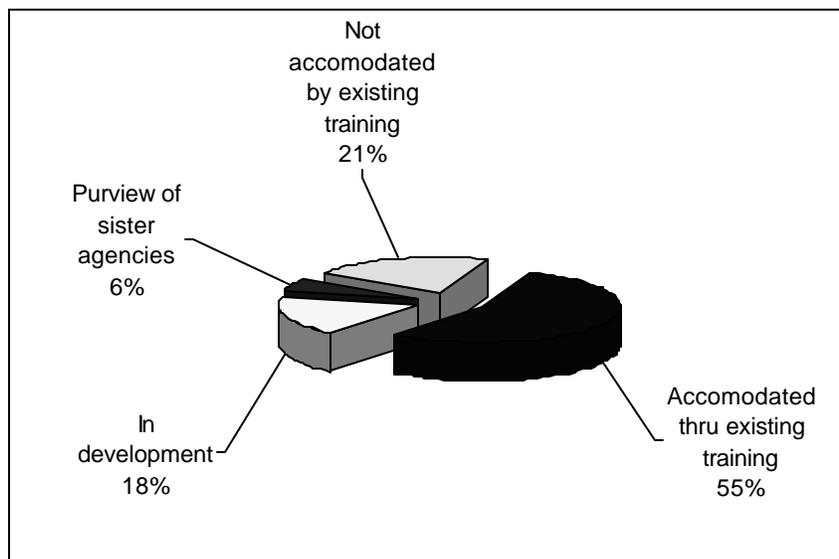
### 1.2 Background

Since 1998, ODP has conducted a thorough analysis of the WMD training landscape to support the development of a comprehensive Training Strategy. Ten distinct disciplines were identified as responding to WMD incidents: Emergency Management Agencies, Emergency Medical Services, Firefighters, Governmental Administrative, Hazardous Materials Personnel, Law Enforcement, Public Health, Health Care, Public Safety Communications, and Public Works. In a survey of subject matter experts in each of these disciplines, 152 tasks were identified as comprising the universe of necessary tasks to be performed prior to, during, and immediately after WMD incidents.<sup>1</sup>

The survey found that ODP has accommodated or is accommodating 73 percent of the tasks unique to WMD, with 6 percent within the purview of sister agencies and 21 percent not accommodated by existing training or current development efforts (See Figure 1, page 2). The survey also found that the 21 percent of the tasks not accommodated by existing training (32 specific tasks), were complex and involved coordination among and between disparate agencies and organizations, or the management of activities within agencies. Though these complex areas require higher levels of the cognitive domain, *The ODP Training Strategy* acknowledges that they are gleaned from more basic level tasks, and urges training development in these areas.

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<sup>1</sup> *The ODP Training Strategy*, Appendix 1 (2001).

**Figure 1. Summary of Tasks Accommodated by ODP Training**

Along with validating the instructional soundness of the WMD curricula, *The ODP Training Strategy* presented the following conclusions and goals:

1. The strategic planning process is important to current and future curricular development for critical, sensitive areas such as WMD;
2. Traditional training methods are appropriate for most tasks, the preferred location for most tasks was “on site” in the agency receiving training, and the preferred methods for providing training and performing evaluations was “projects and exercises”;
3. There is a clear and present need for the standardization of expectations and performance measures for tasks associated with the response to WMD threats;
4. It is critical for ODP to maintain its position of prominence in facilitating the training efforts of each of the 10 key disciplines;
5. ODP should be the coordinating force at the federal level to “build capacity” of the local and state agencies and organizations, in a collegial fashion;
6. ODP should develop those courses needed to accommodate tasks which are not covered by existing training or influence disciplines to expand or bridge the existing training to accommodate the tasks.

Using the findings and conclusions of the Training Strategy as a foundation, ODP then published the Emergency Responder Guidelines to help provide the Responder community with a baseline understanding of the training content necessary to respond to acts of WMD terrorism safely and effectively. Though not provided as official regulations, the guidelines presented an integrated compilation of responder skills, knowledge, and capabilities. In effect, it served as a practical guide to the required WMD subject matter for first responders, course developers, and trainers.

### 1.3 Purpose and Scope

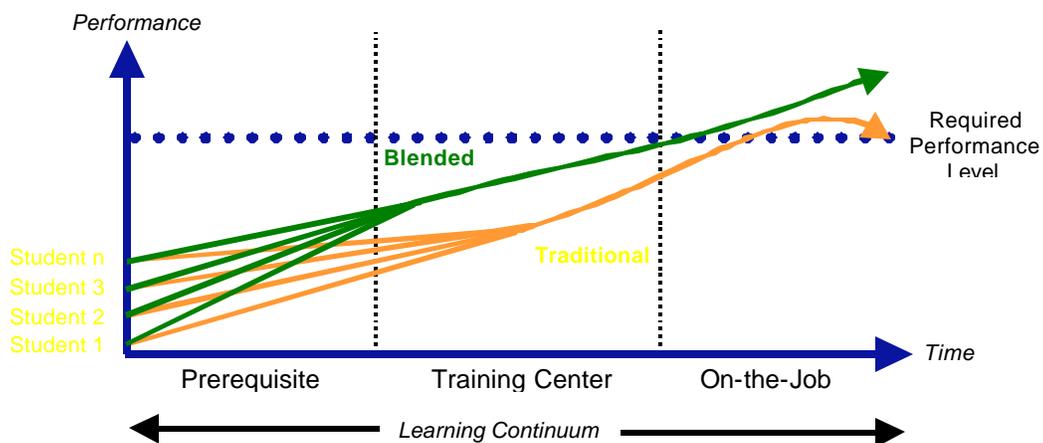
This document is intended to serve as a practical guide for achieving the organizational goals identified in *The ODP Training Strategy* for improving WMD training through Blended Learning. This includes the necessary components, approaches, and considerations for delivering effective and consistent First Responder training.

The approach defined in this document recognizes existing ODP training processes (including Grants, Training and Technical Assistance, and Exercises) and recognizes the need to balance successful, existing instructional methods with the appropriate mix of Blended Learning technologies to:

- Increase the quality, consistency, and accessibility of training (any time, any place)
- Maximize content sharing and reuse among sister organizations
- Reduce classroom time by providing prerequisite learning materials via alternative media
- Increase training effectiveness and throughput by institutionalizing best practices

Blended Learning will ultimately provide the means to sustain First Responder performance levels over time, as seen in Figure 2 below.

**Figure 2. Performance Impact of a Blended Learning Strategy**



This document is not intended to be prescriptive. It includes concepts and tools to assist ODP and its training partners in performing analyses and reaching their own well informed training and performance support decisions. The remaining sections of this document describe these concepts in greater detail.

### 1.4 Target Audience

The primary audience for this document is ODP's training partners consisting of members of the National Domestic Preparedness Consortium (NDPC) and others who develop and deliver training content to First Responders. This group will be responsible for communicating the strategy and overseeing the implementation within their organizations. Further descriptions of these partners and the role they play are presented in the ODP Stakeholder Panel document.

## 1.5 Strategy for Blended Learning

### 1.5.1 Overview

The overall goal of the *ODP Training Strategy* is to ensure domestic preparedness. A strategy supporting this goal must be:

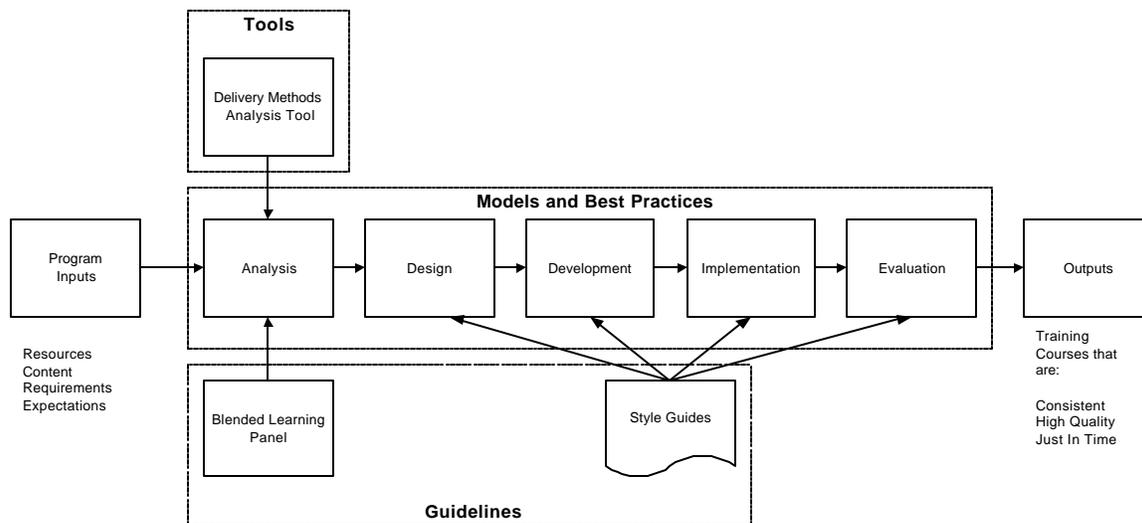
- Comprehensive and integrated – to include all ODP program components that are related to training, training requirements, and human performance (e.g., Training, Exercises, and Equipment and Technical Assistance).
- Performance-based – to improve effectiveness in real-world crisis situations. A performance-based, integrated strategy would enable real-world results from exercises and incidents to drive training content and priorities.
- Efficient – able to leverage precious resources including facilities, funding, and expertise, to achieve the most return on the investment.
- Consistent – aligned with the goals of the *ODP Training Strategy* and *Emergency Responder Guidelines* as described in Section 1.1.

This section outlines a strategy designed to meet these requirements. It is important to note that this strategy builds on the existing *ODP Training Strategy* and highlights the importance and effectiveness of the training centers that provide unique, hands-on exercises and experiences. Unfortunately, traditional methods alone cannot meet the dynamic requirements of the First Responder community. Alternate instructional delivery methods can more efficiently and effectively meet these requirements. Combining these alternative instructional methods with traditional delivery constitutes the “blended” approach.

The ODP Strategy for Blended Learning involves three major baseline components:

- Guidelines
- Models and Best Practices
- Tools

These components are illustrated in Figure 3 (page 5).

**Figure 3. Baseline Strategy for Blended Learning**

- Program inputs would include all information, resources, content and requirements for the design and development of a training course.
- Guidelines are established and agreed upon by the Blended Learning Stakeholder Panel and are codified in Style Guides that provide guidance on the design concept, interactivity, media and graphics, ADL SCORM conformance, and 508 compliance for courses.
- Models and Best Practices are provided through the Analysis, Design, Development, Implementation and Evaluation (ADDIE) model and the Style Guide that illustrate lessons learned in courseware production.
- Tools such as the Delivery Methods Analysis Tool are provided to guide the determination of appropriate delivery methods for courses or modules, in a consistent manner.
- Outputs of this model are just-in-time courses or other learning products that are consistent, effective, efficient, and of high quality.

### 1.5.2 Considerations

As identified in *The ODP Training Strategy*, “resources must satisfy several million individual responders in need of initial training and sustainment training.” To help relieve the pressure on faculty and facilities caused by this challenge, it is important to identify some means of increasing student throughput by exploring the possibility of moving content out of traditional classroom delivery, converting it to an alternative media, and delivering it at the Responders’ work or home site.

This document views these alternative instructional methods as support systems that:

- Enable large numbers of trainees to meet awareness-level training objectives at minimum cost. ODP training is provided to First Responders from ten professional areas nationwide. This potentially heterogeneous trainee population constitutes a challenge for instructor-led training.

- Better prepare trainees to take advantage of instructor-led training experiences. Trainees lacking prerequisite knowledge are likely to require remediation. Meanwhile, more knowledgeable and experienced trainees have little to challenge them as others are brought “up to speed.”
- Enhance the effectiveness of instructor led training. Blended Learning can enhance the efficiency and effectiveness of the classroom experience by ensuring that all attendees arrive at the training site with a baseline of knowledge, accurate and realistic expectations, and be ready to learn, allowing instructors to offer a more productive and robust training experience in a shorter time frame. At training centers, this increased efficiency can result in more time available for valuable hands-on experiences and exercises. Furthermore, some elements of Blended Learning media (graphics, animations, and video clips) and stand-alone content (reviews and practice exercises) can be used within the classroom to further enhance the training experience.
- Reinforce and sustain the knowledge and skills acquired through instructor-led, hands-on training experiences. Blended Learning can also reinforce and sustain what was learned in the classroom. Most people forget about 80% of what they have read within two weeks. Even intensive training experiences decay over time. To reduce that decay, the learning that takes place at training centers can be further reinforced through alternative distance delivery after students return to their duty stations.

Several considerations are important in defining a Blended Learning approach. These considerations are described in the following sections.

#### 1.5.2.1 *Right Media, Right Job*

The many alternative delivery and support methods provide rich choices for delivering knowledge-based content. However, the array of available media and delivery can be confusing. To make sense of these alternatives, it is useful to categorize them using the following criteria:

- Purpose - are they best suited for communication, or training, or both?
- Time dependency - are they scheduled (synchronous) or available on-demand (asynchronous)?
- Interactivity - do they provide high levels of student interactivity, opportunities to respond, or minimal student involvement?

Using these criteria, various Blended Learning methods are summarized in Section 1.6 (page 9). To help Training Partners select the right media, a media selection tool is included in Section 1.6.1.3.3 (page 15) using specific combinations of audience, content, and instructional objectives.

### 1.5.2.2 *Delivering a Consistent Message*

Maintaining the consistency of information presented in training is an important consideration when designing WMD training for inter-agency use. Introductory material that establishes a common foundation for subsequent course-work is ideally suited for pre-work training. Because the knowledge, skills, and experience of new students are highly variable, alternative self-paced delivery of pre-work content will enable students to take control of their own learning progress, to “test-out” of sections of training, while others remediate at their own pace until confident. Better-prepared students with more consistent entering knowledge can increase the efficiency of classroom instruction, further improving input.

### 1.5.2.3 *Performance-Based*

Instruction can involve two different types of learning: knowledge acquisition and practice to proficiency. Knowledge acquisition involves learning new facts, ideas, concepts, processes, and skills. Practice to proficiency involves turning learning into experience by applying already-learned knowledge and skills in realistic settings, until a prescribed level of proficiency is attained.

Most training, and much of the content in the First Responder curriculum, involves the acquisition of new knowledge and skills. However, for many aspects of WMD training, acquiring new skills and knowledge, while essential, is not sufficient. When knowledge must be applied in complex real world settings that involve situation assessment and decision making under stress, there is no time to stop and try to recall what was learned. Learning must be internalized through practice - sufficient enough to assure high levels of proficiency and retention. Currently, the integration and application of what was learned in the classroom is provided through practice and exercises that are used for student evaluation.

The instructional effectiveness of First Responder training is largely determined by the ability of users to:

- Retain and recall the most important knowledge and information taught in the curriculum
- Effectively apply the skills acquired during exercises when confronted by challenging real-world situations

To be effective, students need more opportunities to integrate and apply their knowledge and skills in realistic situations. Field exercises that provide such opportunities are often too labor-intensive and time-consuming to provide enough practice for skills to become “automatic”. Simulation is an excellent candidate for providing integrative contexts and practice opportunities for students to apply their newly acquired knowledge and skills until attaining acceptable levels of proficiency. Fully internalizing critical knowledge and skills is an extremely important training objective for First Responders who must later face situations that do not afford them the luxury to stop and try to recall what to do next.

Over the next two years, the use of PC-based Part-Task Simulation will become far more common for training First Responders. The notion of Part-Task Simulation was derived from flight training applications and the military. It is an acknowledgement that simulation cannot capture all of the complexities and nuances of complex tasks in the real world. They generally provide environments that simulate a critical part of a larger task, or enable the practice of a sub-set of the skills required in the real world. Military uses of networked simulations for mission rehearsal and the training of unit commanders, such as the Marine Corps Small Unit Leader Non-Lethals Trainer, are moving to civilian applications.

#### 1.5.2.4 *Reinforcement*

Newly acquired information is often quickly forgotten unless it is associated with already meaningful knowledge and constructs. Reinforcement training aids in the retention of information by restating the information in a variety of contexts. As an integrated part of the First Responder training program, reinforcement training, in the form of a technology-enabled media, would be used to summarize pre-work content and present exercises for applying content learned in the classroom.

#### 1.5.2.5 *Refresher/Job Performance Aid*

Crisis situations require finely honed skills and split-second responses. Refresher training is a means for responders to keep their skills sharp, and their knowledge current, throughout their careers. Much of the content developed for refresher training, along with computerized or Web-based simulations, could be provided to responders at their job sites, and made available on-demand. In addition, opportunities to package information in the form of Job Performance Aids (JPA) could be identified and distributed. A JPA, in the form of field-use cards or Personal Data Assistant (PDA), would be instantly available to the responder whenever needed to summarize critical procedures that would be needed to accurately assess a situation and save lives.

#### 1.5.2.6 *Mapping Available Technologies to Support Training Objectives*

A well-designed Blended Learning Solution makes valid and justifiable decisions about when to use technology and when to involve instructors and exercises. By adopting a Blended Learning distribution model, trainers can incorporate the classroom as only one of several ways to deliver learning and development to First Responders.

There are many technologies that can be used to support a Blended Learning approach to training (e.g., training technology and communications technology). While most media are flexible and can be used for a variety of teaching functions, some media provide a better representation of objects, facts, ideas, processes, etc., and have great potential to develop learning skills. Choosing the technology that best supports the training goal involves consideration of several factors:

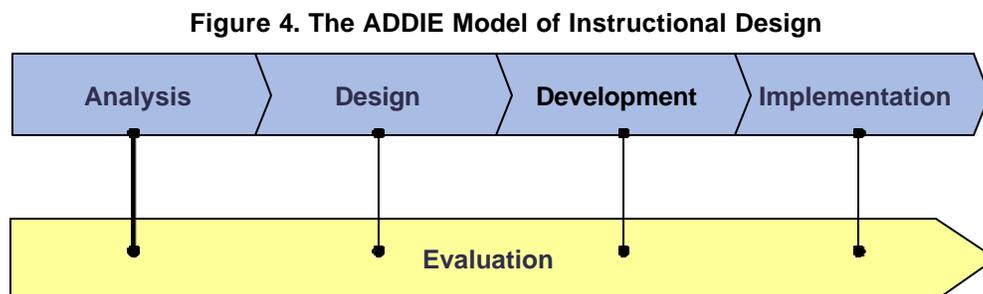
- Which media are likely to appeal to the learners?
- Do the learning objectives suggest a particular media?
- Is the technology needed to support these media available?
- How should each of the preferred media be used, and how much should each be used (for example, for what portion of the student's time)?

- What is the cost for designers, instructors, and learners in money, time, and flexibility-to use these media?
- Would less expensive media be sufficiently effective?
- Do the chosen media offer variety of stimulus and activity?
- How can the media be combined for maximum effect?

The Blended Learning Strategy will help to establish common standards and processes for development where possible, addressing delivery in an environment where infrastructure constraints vary widely. With the high degree of variability in available First Responder technology, training planning decisions will in many cases need to be based on educated guesses about the best delivery means when employing more than one technology strategy for a given course (e.g., putting a course online and offering a CBT version simultaneously). A description of these technologies can be found in Section 3.0.

#### 1.5.2.7 *Instructional Systems Design and the ADDIE Model*

Instructional Systems Design (ISD) is the most widely used methodology for developing new training programs. This approach provides a step-by-step system for the evaluation of students' needs, the design and development of training materials, and the evaluation of the effectiveness of the training intervention. There are many ISD models, but almost all are based on the "ADDIE" model - Analysis, Design, Development, Implementation, and Evaluation, as illustrated in Figure 3 below. Each step has an outcome that informs the subsequent step.



Adoption of this model will promote best practices and establish a consistent methodology for the selection and use of appropriate tools and media in a Blended Learning environment. The details of this model and how it can be applied are addressed in Section 1.6.

## 1.6 Applying the ADDIE Model

This section presents the ADDIE instructional design model as the foundation for a Blended Learning approach. It focuses on the critical phase of analysis to provide the strategy for the remaining phases. Finally, this section explains the purpose of the ADDIE model which is to incorporate the results of the analysis and provide a foundation for the remaining phases.

A specialized approach is necessary with Blended Learning to select, design, and develop training courses. Content should be examined and assessed from the unique perspective of strategies, concepts, and tested practices.

In this section, the five stages of the ADDIE model are mapped to specific tools and processes that will enable the training partners to link available Blended Learning technology to specific training objectives. The goal is to find the most appropriate solution for the end user community. While specific methods and tools may differ among alternative media development, the phases of the ADDIE model are present in each.

### 1.6.1 Analysis

The Analysis Phase is the first phase of any instructional design project and the most critical phase in the implementation of a blended approach to training. Through a proper analysis, the “Who, What, Where, Why, and By Whom” is determined for the training program. The following processes are included in the Analysis phase:

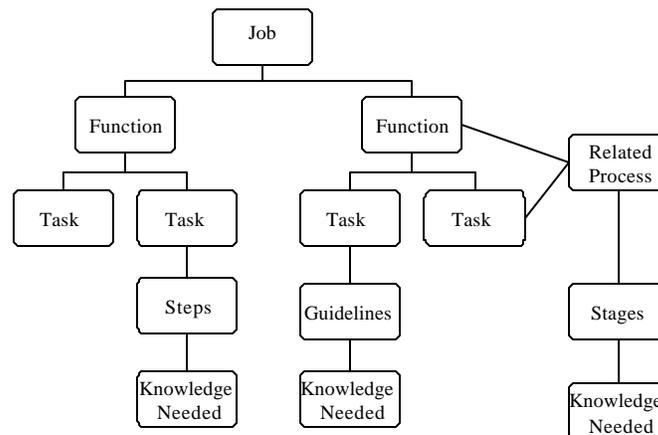
- Curriculum or Needs Assessment
- Course Outline
- Delivery Methods Analysis

#### 1.6.1.1 *Curriculum or Needs Assessment*

The first step in the Analysis process is to decide if a problem can be solved with training by performing a needs assessment. A needs assessment is the process of determining the need to improve performance in a specific area and to what extent the performance should be improved. The determination is based upon the discrepancy between desired and actual performance.

The needs assessment identifies the characteristics of the target group of learners. Learner characteristics include knowing the requirements of the target groups’ job in terms of the background knowledge and skills. The information obtained regarding these characteristics will assist in defining the needs and constraints of the course.

The second step of Analysis is to decide the goal of the instruction and the content that will be included. This decision may be determined through a process called task analysis. Typical steps in a job task analysis include determining prerequisites, identifying job functions, identifying tasks within each function, and determining the task as procedural, process or principle based. The outcome of this process is the identification of the skills and knowledge that will structure the training program.

**Figure 5. Sample Task Analysis**

The next step examines the identified learning areas to define specific and measurable objectives. These objectives will determine the skills, knowledge and situations that must be developed and will provide a framework for the content. Higher-level skills and knowledge should be identified wherever possible so that understanding and problem-solving abilities are developed in learners.

#### 1.6.1.2 Course Outline

A key output of the analysis phase is a detailed course outline. The course outline is the foundation of the complete course and guides the designer to organize content considering knowledge of the target audience, the course goals and objectives, and any resources materials, including information obtained from subject matter experts (SMEs).

Course content is organized into a detailed, logically sequenced outline considering knowledge of:

- The target audience
- The course goals and objectives
- Any resource materials, including information obtained from SMEs

To ensure a complete and logical sequence of instruction, there must be a grouping of related objectives and activities, and a sequencing of teaching activities. Objectives should be sequenced according to their learning level hierarchy so that the instruction begins with developing knowledge and then progresses to applying that knowledge after it has been understood (skills). Learners can then be taught how to apply the knowledge and skills to a variety of situations.

Once the objectives have been sorted into learning levels, sequencing of content can proceed according to a logical structure, such as:

- Proceeding from what learners know to what they do not know
- The logical or historical development of a subject

- Proceeding from concrete experiences to abstract reasoning

### 1.6.1.3 *Delivery Methods Analysis*

A specialized plan of action is necessary to select, design, and develop training courses for Blended Learning. It is advisable to assess course content from the unique perspective of strategies, concepts, and tested practices. Two essential activities used in a delivery methods analysis are a Training Delivery Strategy Analysis and a Media Selection Analysis.

The first step in a Delivery Methods Analysis is to conduct a Training Delivery Strategy Analysis. This procedure examines key elements of course content and assists in the determination of which course modules may be appropriate for Blended Learning delivery. As specific modules are nominated for possible alternative media delivery, each module is examined with the media selection analysis tool. This procedure examines general and specific criteria for each delivery technology in order to identify those technologies most appropriate for delivery of the specific module.

#### 1.6.1.3.1 *Training Delivery Strategy Analysis*

Elements considered include outputs from the needs assessment and task analysis, as well as the following requisites:

- **Audience Composition** - The number of participants, their job duties, knowledge, experiences, and learning styles constitute a profile by which better decisions can be made about course development and delivery. Analyzing and using this profile to inform the development and delivery process will maximize learner understanding, retention, and application.
- **Course Goals and Objectives** - To effectively present training information, increase knowledge and understanding, and promote skill building, those who develop training must be able to clearly express what they expect participants to learn.
- **Course Modules** - Course modules represent relatively self-contained components of associated information that can stand alone as a lesson or session, but are part of a larger topic. Modules segment information so that it is easier for learners to grasp and retain.
- **Course Compression** - Course content is streamlined and divided into modules containing only content that is specific to that module's learning objectives. Module content is then restructured/reorganized, to ensure a consistent flow of information. As a result of this process, course conversion may experience a 20-50% compression of content.
- **Course Prerequisites** – Considerations are made for previous knowledge, experience, or training that is needed before the course is taught.
- **Course Participant Preparation** - Course preparation is pre-course materials (i.e., questionnaires, exercises, self-assessments, or video tapes) or a pre-course learning event (i.e., audioconference or online conference) that the learner is required or recommended to complete before attending a course.

- **Course Follow-up** - Considerations are made for addressing learner needs after the course has been delivered (i.e., providing clarification, increasing understanding, and supporting the transfer of knowledge to job performance).
- **Course Assessment** - Feedback and evaluation data reflecting participant satisfaction and learning that supports the continuous improvement of a Blended Learning program.

#### 1.6.1.3.2 Media Selection Analysis

The selection of appropriate media and technology for a specific course module is an essential element of effective and efficient use of available learning technologies in a blended approach. Often the same content can be delivered effectively in more than one medium. Therefore, the process of media selection is one of identifying the most appropriate media alternatives for a specific situation. Media selection analysis must evaluate general and specific criteria, including instructional, student, and cost aspects for each delivery technology to identify those technologies that are most appropriate for delivery of the specific module.

There are many technologies that can be used to support a blended learning approach to training. The following table provides an overview of the major delivery and support technologies available today.

**Table 1. Delivery Technologies**

Delivery Technology	Description
<b>Instructor-Led Training (ILT)</b>	The ILT delivery method traditionally takes place in a classroom. The instructor provides knowledge or information to students in a systematic manner by presenting information, structuring learning experiences, and managing group discussions and activities.
<b>Interactive Video Teletraining (IVT)</b>	IVT is defined as a one-way video, two-way audio, training technology; includes the capability for students to ask questions of the instructor and to respond to other students.
<b>Video Teleconferencing (VTC)</b>	VTC systems are two-way communication systems that offer both audio and video from local and remote sites.
<b>Electronic Performance Support Systems (EPSS)</b>	EPSS provides on-demand access to information that a participant may need to perform a specific task. EPSS also provides a decision support system that enables students to identify the appropriate action required for a particular set of conditions within their working environment.
<b>Computer Based Training (CBT) and CD-ROM</b>	Interactive instructional experience between a computer and a participant where the computer provides the majority of the stimulus and the student responds, resulting in progress toward increased skills and knowledge.
<b>Web-Based Training (WBT)</b>	On-demand electronic training stored on a server and accessed across a network. It is delivered over public and private computer networks and displayed by students on a Web browser. Student access is asynchronous, and self-paced.

<b>Collaboration Environments (Synchronous Web-Based Training)</b>	Software and services delivered over the Web that enable synchronous e-conferencing, text chat, audio, video, document and application sharing, whiteboards, presentations..
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**Table 2. Support Technologies**

<b>Support Technologies</b>	<b>Description</b>
<b>Synchronous Online Tools (SOT)</b>	These tools allow synchronous communication over the Web and include a variety of products. Some of these products are stand alone with just one capability such as text chat. Other products may bundle these tools with additional features such as whiteboards, session recording, polling/voting, presentation and application sharing.
<b>Audio Conferencing</b>	An electronic meeting in which students in different locations use telephones or audio conferencing equipment to interactively communicate with each other in real time.
<b>Audiographics</b>	Audiographics combines audio conferencing with personal computer text and graphics, allowing both voice and data to be transmitted to remote sites. Typically, a site consists of audio conference equipment, plus a large screen that serves as an electronic whiteboard. This system allows two-way data exchange between instructor and students.
<b>Asynchronous Online Tools (AOT)</b>	These tools allow asynchronous communication over the Web using tools such as threaded discussion groups, email, listservs, and search engines.
<b>Print</b>	This asynchronous tool is generally no longer used as a sole delivery method, but should be considered as a supplemental tool for effective Blended Learning, especially when prepared in electronic format for dual distribution.
<b>Video On-Demand and Web Casting</b>	Video content that can be delivered real time via the Web or downloaded to network servers. Students can access the system, get the specific information, data or instruction they require at whatever time of day or night they wish.
<b>Video Tape</b>	A method of capturing learning content on tape for viewing on-demand. It can be used as the sole means of content or as part of a blended approach to training. It is often used to capture real time event and is a useful tool because it captures an accurate image.

1.6.1.3.3 *Advantages and Limitations of Delivery Media*

An analysis of available technologies must include a thorough examination of the advantages and limitations that each present within the current training environment. Traditional courses cannot be transported to blended delivery without significant modification. Courses conversions will need to take advantage of the special characteristics of that medium, such as high levels of visualization and interactivity, and minimize the limitations of the medium, such as no visualization (audio conferencing), or the inability to see the students (one-way video/two-way audio).

The following sections address the advantages, limitations and instructional strategies for the major media listed.

1.6.1.3.4 *Instructor Led Training (ILT)*

**Advantages** - ILT is a traditional method of training that is comfortable for both students and instructors. It provides social interaction with immediate feedback, can be used with variably sized audiences, and can “blend” a variety of media into instruction that tailors content to the group or can be adjusted by the instructor while in progress. Students are removed from the work environment so that they can focus on the content free from distractions.

**Instructional Strategies** - The following instructional strategies can be implemented in a face-to-face environment:

Strategies	
<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Guest Speaker</li> <li>• Large Group Discussion</li> <li>• Small Group Discussion</li> <li>• Cooperative Learning</li> <li>• Peer Teaching</li> <li>• Brainstorming</li> <li>• Case Studies</li> <li>• Panel Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Interview</li> <li>• Field Experiences</li> <li>• Lab Experience</li> <li>• Role Playing</li> <li>• Simulation</li> <li>• Demonstration</li> <li>• Drill and Practice</li> <li>• Discovery</li> </ul>

Many educators today are advocating the use of “blending” technology with face to face training to reinforce skills and knowledge, provide different avenues for students to explore, and to address different learning styles in the classroom, among others.

**Limitations** - While removal from the work environment may be beneficial for learning, prolonged absence from the workplace may impose hardships for work sites that must function for extended time periods without essential staff. Also, time and expenses for students and trainers to travel to “exotic” locations to attend training may be difficult to manage, and scheduling of training may not meet the needs of everyone who needs instruction. ILT moves at one pace, cannot provide enough time for individual feedback, and does not account for individual rates and styles of learning. It relies heavily on instructor knowledge and cannot promise a consistent delivery for all students trained by other

instructors. Most importantly, training usually ends at the completion of class time and learning often lacks transfer to the workplace.

#### 1.6.1.3.5 Interactive Video Teletraining

**Advantages** - IVT has the ability to simulate the classroom environment, can incorporate a variety of media, and can ensure a consistent delivery of content across geographical boundaries to a much larger audience in a shorter period of time. It can also provide high levels of interaction and immediate feedback to questions despite the distance between instructor and students. Travel costs for both students and instructors are reduced and less time is needed away from the job site for training.

**Instructional Strategies** - The following strategies often work well in an interactive video teletraining event:

Strategies
<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Guest Speaker</li> <li>• Panel Discussion</li> <li>• Field Experiences</li> <li>• Demonstration</li> </ul>

It is important in this media to limit the content coverage to 3 to 4 key points per 50-minute tele-lesson (ideal time frame). Developers and instructors should strive to visualize as much as possible with pictures, graphics, video clips, word pictures, and other visualization techniques. Industry experts suggest three times as many visuals for interactive television as for traditional teaching. Video clips should be used, if available, to illustrate and reinforce key points. Activities or exercises should involve students at least 30 percent of the teleclass time.

**Limitations** - IVT requires the availability of a satellite broadcast infrastructure with studio uplinks and receiving site downlinks, therefore access may be limited to some learners (though ODP and its training partners have made a significant investment in their existing satellite infrastructure). Satellite time is expensive, and although it can reach vast audiences, large time zone differences may require some learners to participate at inappropriate times. Special training of the instructor is necessary to handle the technology, as well as a large staff to handle the broadcast equipment. Most IVT networks offer only one way video of the instructor and if the program is not well designed, becomes little more than a talking head with little or no interaction, making it unsuitable for content that requires deep processing of content.

#### 1.6.1.3.6 Video Conferencing (VTC)

**Advantages** - Although VTC can provide two way video, it has many of the other advantages (and disadvantages) of IVT. Less expensive than IVT, it can simulate the classroom environment, incorporate a variety of media, and can ensure consistent delivery of content. It can be highly interactive and offer immediate feedback. Travel costs for both students and instructors may be even less than for IVT if equipment is available at the job site.

**Instructional Strategies** - The following strategies often work well in a Video Teleconferencing environment:

Strategies	
<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Guest Speaker</li> <li>• Large group discussion and brainstorming</li> <li>• Case study</li> </ul>	<ul style="list-style-type: none"> <li>• Panel Discussion</li> <li>• Interview</li> <li>• Lab experiences</li> <li>• Demonstration</li> <li>• Drill and Practice</li> </ul>

Although instructors may need additional training, many of the strategies implemented in traditional training work well here. Videoconferencing can allow students to meet and confer with others across the country. Instructors find it easy to include lecturers, subject matter experts and guest speakers in classroom instruction. Two-way video facilitates collaborative learning via discussion, brainstorming, and group projects. Optional equipment such as VCRs, video scan converters, document cameras and allow instructors to include video illustrations, display PC application screens and “zoom in” on objects for classroom discussion.

**Limitations** - VTC may present access problems if the necessary equipment is not available locally. Delays due to compression and decompression rates of video may result in video and audio out of synchronization, distracting learners. As in IVT, large time zone differences may require some students to participate at inappropriate times. As with IVT, careless or ineffective design makes it unsuitable for content that requires deep processing of content.

#### 1.6.1.3.7 Electronic Performance Support Systems (EPSS)

**Advantages** - EPSS can provide invaluable job aids by simplifying tasks and processes and providing just in time access to accurate information and to refresher training. The elaborate help system reinforces knowledge through practical exercises and immediately validates students’ abilities to perform the task, empowering them to be more self-sufficient.

**Instructional Strategies** - The interface of an EPSS application determines to a great extent if students will use that application or not. Interface components include the position of elements on the screen, appearance and color, screen size, texture, sound, visual effects such as animation, and metaphors that accurately represent the real-world or real tasks that students perform. Good interface design meets the following criteria:

- The screen architecture (structure and navigation) must be consistent within an application.
- Screen elements must be placed so they are easy to find and use.
- Screen real estate usage must ensure that "clutter" is minimized.
- Menus and data input forms must be intuitive and easy to use.

**Limitations** - EPSS, built for performance support, is by its nature not suitable for initial training. Students will need initial training on the topic, as well as training to become comfortable with the EPSS tool functionality. In addition, the EPSS tool is not structured in a linear fashion and does not capture student input, so there is no easy method to measure whether students are using it or how often. Finally, the tool usually provides no method to effectively evaluate learning.

#### 1.6.1.3.8 Computer-Based Training (CBT)

**Advantages** - CBT can provide a consistent delivery to audiences; can be easily sent to a large audience by mail or distributed via network; and can accommodate individual time schedules. With its large capacity for sound, video, and graphics, concepts are presented in their best form, motion or action is shown in video or animation, sound is presented as sound, and assembly or construction is shown as video or animation and practiced with hands-on simulations. Students can control the pace of instruction, receive immediate feedback to enhance learning and can “opt or test out” of lessons already mastered or repeat lessons to build competency. Production can be cost effective if large numbers are produced.

**Instructional Strategies** - CBT often employs the following strategies:

Strategies	
<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Guest Speaker</li> <li>• Case Studies</li> <li>• Computer-assisted Instruction (CAI)</li> <li>• Lab Experience</li> <li>• Role Playing</li> </ul>	<ul style="list-style-type: none"> <li>• Simulation</li> <li>• Demonstration</li> <li>• Drill and Practice</li> <li>• Tutorials</li> <li>• Discovery</li> </ul>

When multimedia is high quality and carefully selected and created, CBT is an extremely useful teaching tool. It is important, however, that all media be carefully chosen for its educational value. Media for the sake of media can become irritating to students and become counterproductive. The ability to accommodate media rich files makes CBT an excellent tool for simulations, role-playing, and drill and practice that may facilitate experiential training.

**Limitations** - Development costs may be high unless a large audience is to be trained. Distribution efforts may require additional resources to track mailing and ensure all students have the latest version. Media content cannot be modified or updated easily and may require an upgrade of hard hardware (sound card, speakers, memory, graphics card). Often used as a self-study media, students may feel isolated and unmotivated to complete training.

### 1.6.1.3.9 Web-Based Training (WBT)

**Advantages** - WBT can provide consistent delivery to extremely large audiences and is considered an excellent training media for development of cognitive objectives as well as attitudinal objectives. WBT can accommodate students with disabilities by use of assistive technologies. It can be designed to support small group work and collaboration. Multi-purposed (training and resource), it can restrict access if necessary to authorized users, is easy to update, engaging if well designed, and can offer students the opportunity to remediate materials until proficient or “opt out” of content they have already mastered. Content can be linked and learning tracked within Learning Management Systems and “modularized” into small units of instruction suitable for assembly and reassembly into a variety of courses.

**Instructional Strategies** - WBT has become an extremely effective media using a variety of instructional strategies including the following:

Strategies	
• Demonstrations and Simulations	• Field Trips and Lab Experience
• Drill and Practice	• Case Studies
• Tutorials	• Lecture
• Games	• Guest Speaker
• Story-Telling	• Cooperative Learning
• Role Playing	• Simulation
• Discussion and Debate	• Discovery and Research

As with other Distributed Learning media, a development strategy must be in place for writing Web-based instruction to ensure students are actively engaged and will be able to meet specified learning objectives. Designers must weigh a number of considerations including effective Website interface development, graphics and rich media development, opportunities for both asynchronous and synchronous learning environments, and the complexities of learning management systems (LMS) and Learning content management systems (LCMS), including interoperability and usability standards and considerations (e.g., SCORM and Section 508).

**Limitations** - WBT is technology dependent, requiring faster Internet connectivity and a slightly higher degree of computer literacy than basic PC knowledge. The interface is not ideal for extensive text and must be well designed to avoid skimming information rather than going in-depth. Development requires specialized knowledge, software, and equipment, with development time often running between 200 to 300 hours per one hour of finished product. Bandwidth limitations may restrict the use of high-end visuals and sound.

#### 1.6.1.3.10 Synchronous Web-Base Training (SWT)

**Advantages** - SWT provides live interaction with instructors, experts and other students and provides an efficient way to disseminate information to dispersed audiences. Additional graphics, video, and sound can enhance content and learning. It can be easily updated, even “on the fly” and is considered an excellent media to achieve both cognitive objectives and performance objectives. SWT supports collaboration, breakout sessions, and can be very engaging if well designed. Students unable to attend a class can access a recorded text of the session after class.

**Instructional Strategies** - Many of the instructional strategies that work well in the classroom can also be adapted for SWT:

Strategies	
<ul style="list-style-type: none"> <li>• Lecture</li> <li>• Guest Speaker</li> <li>• Small Group Discussion</li> <li>• Cooperative Learning</li> <li>• Peer Teaching</li> <li>• Brainstorming</li> </ul>	<ul style="list-style-type: none"> <li>• Case Studies</li> <li>• Panel Discussion</li> <li>• Interview</li> <li>• Simulation</li> <li>• Demonstration</li> </ul>

While some synchronous tools support streaming video, equipment and bandwidth requirements usually prohibit two-way video of instructor and students. While much of the visual content can be shared with the class through graphics, application sharing and Web surfing, designers and instructors must consider the fact that students may only be able to discuss their views and interact via the audio connection.

**Limitations** - Synchronous training by nature is less flexible than asynchronous, requiring students to be available when the class is held. This type of Web-based delivery is also technology dependent, requiring Internet connectivity and student familiarity with application software. In addition, firewall issues within student organizations may make connection difficult or prohibit connection entirely. Development, although relatively easy for trained providers, must be well designed to engage remote students. Too often, content is limited to simple text in PowerPoint slides with few other techniques to engage other learning styles. Bandwidth limitations usually restrict the use of high-end visuals and sound as well as limit class size to between ten and fifteen students. If too many students access the session at different speeds, students may have to wait for others to view displayed screens or post remarks, lowering the motivation to continue.

#### 1.6.1.4 Support Technologies for Distance Delivery

Several technologies, both old and new, can supplement the media chosen as the main delivery method, adding flexibility and sophistication to instructional design. The following media are not recommended as sole or primary delivery media, but should be examined for their ability to support and enhance a blended approach that increases interactivity, addresses learning styles, motivates students and provides an engaging and effective training outcome.

- **Print Materials** - This asynchronous tool is generally no longer used as a sole delivery method, but should be considered as a supplemental tool for effective Distributed Learning, especially when prepared in electronic format for dual distribution. Courses that “blend” this technology into training solutions may use the media to reach students who may not have Web access (such as Responders out in the field or in remote locations), or may simply need to provide supplemental materials in both print and electronic forms. Print materials can provide inexpensive representations of charts, graphics, and text to supplement instruction, and can provide pre-training or refresher materials as well as effective job aides. This cost effective solution can be used in role-playing, drill and practice, case studies, as well as discovery instructional strategies.
- **Audio Conferencing** - While students might have difficulty remaining engaged for course material delivered entirely via this media, audio conferencing can be a valuable support technology if students need to receive modification or updates to course content quickly, or feel the need to interact with instructors or experts and other students to clarify content previously delivered. This synchronous technology can also be a valuable media for asynchronous delivery of content, providing opportunities for brainstorming, role-play, and discussion that might not be available in the media selected for course content delivery.
- **Audiographics** - By combining audio conferencing with text and graphics provided by technology, both voice and data can be transmitted to remote sites. This support technology provides synchronous communication between instructor and students at a relatively low cost and can serve to transmit the complex images, animation and sound that other blended media cannot. This synchronous tool can be very interactive, easily updated, and provide even the novice instructor with local control of the learning environment.
- **Videotape** - Because of its limitations, videotape (often used in the past as a sole means of delivery content) is today considered better implemented as part of a blended approach to training. Low tech and user friendly, it is often used to capture real time events with accurate images. It can effectively convey a motivational or emotional message and is a useful tool for modeling behavior.
- **Video on Demand and Web Casting** - With many of the characteristics of videotape, delivering live or delayed versions of sound or video broadcasts via the Web may not be considered appropriate as the sole media for delivery of content, but is considered extremely useful as part of a blended approach. By providing students with Web access to pre-recorded training content, they can access the system and get the specific information, data, or instruction they require when needed. Like a VCR or DVD player, important sections of the program can be paused and watched repeatedly if necessary or skipped at the student’s discretion.

- **Synchronous Collaborative Online Tools (SCOT)** - While not a delivery medium, these simple tools allow students to communicate and share files and graphics and can support blended solutions in variety of ways. Examples of SCOT are chat programs such as AOL's Instant Messenger and whiteboard software such as that included in Microsoft's NetMeeting. SCOT provides real time, immediate interaction for all students. They can be used by instructors to provide after class access for follow up discussion and Q&A or to conduct one-on-one private conversations with students to encourage or modify behavior. Students can also use the tools to share ideas about class content and collaborate on class projects.
- **Asynchronous Collaborative Online Tools (AOT)** - Asynchronous Support Technologies such as e-mail, threaded discussion groups, and listservs, allow students to post and reply to comments regardless of time or location. As with some of the synchronous tools, AOT can help instructors encourage or modify student behavior as well as support communication between students. Those self-conscious about disabilities or differences need not reveal it to the group. Multiple topics can be discussed concurrently with contributions organized by topic. Students can retain discussion messages and take time to mull over ideas, check references, and refer back to previous postings before making a comment.

## 1.6.2 Design

Once the blended solution is determined in the Analysis phase, the Design phase creates the "blueprints" for the instructional experience. In this phase, the instructional designer plans the elements of instruction, such as instructional objectives, assessment strategies, course outlines, design documents, style guides and storyboards to describe the presentation of content, practice activities, and feedback mechanisms.

The following processes are included in the Design phase:

- Design Document
- Style Guide
- Storyboards

During the design phase, the following questions are addressed:

- **How will the content of the learning material be structured -** Sequencing, presentation, and reinforcement of the content will rely on grouping of related objectives and activities. Dividing the course content into lessons and determining the best order in which to present those lessons are the most challenging parts of the ISD process. The designer must have a clear understanding of the content in order to clearly interpret and communicate it to the desired audience. This process begins in the Analysis phase when developing the course outline. The outline is then finalized in the Design phase.

- **How will learning be assessed** - Assessment measures the competence or capability of students in terms of whether or not they have realized the objectives. Feedback is important because students need to assess the adequacy of their responses and learn from the assessment experience.
- **What resources and strategies will be used in the instruction** - Teaching resources and activities should be chosen to complement the learning outcomes.

#### 1.6.2.1 *Design Document/Video Treatment Script*

The purpose of the Design Document (sometimes referred to as a Video Treatment Script in synchronous training such as IVT, VTC and Synchronous Web Training) is to create a roadmap to use throughout the course design and development process. It provides a skeleton of the course content and documents the detailed expectations. A Design document typically includes the following items:

- Course structure and flow
- Definition of assessment and instructional strategies
- Interactivity guidelines
- Technical specifications
- Estimation of the course length
- The prototype objective
- Final detailed course outline

##### 1.6.2.1.1 *Style Guide*

A style guide sets the standards for the design, development, and production of training courses. It provides tools and best practices and sets the foundation for the final four phases of the ADDIE model. Establishing a consistent style provides uniformity across courses and ensures clear guidance and high quality materials. The style guide also increases course development efficiency by avoiding repeated design, development, and evaluation of key courseware elements.

A style guide for Web-based development will be provided as an Appendix item in the final version of this document.

##### 1.6.2.1.2 *Storyboards*

Storyboards are the blueprints of an interactive courseware design and development process. They provide a combination of text and graphics or graphic descriptions that convey all the necessary information about the delivery of course content. Storyboards describe in detail all images, animations, movie segments, sound, text and navigational paths. The more complete, detailed, and accurate they are, the fewer the assumptions, questions, delays, confusion, and errors that occur later, during the costly Development phase. An accurate content outline, course design document, and style guide are essential to the success of the storyboard design.

### 1.6.3 Development

Development is the production phase of the ADDIE process. During development, the plans defined in the Design phase become reality. In this phase, the instructional designer is concerned with issues such as using the instructional materials to facilitate and support learning. Interactivity is also a key concern. Designers and developers work to incorporate the visual design of the instructional materials to best support and facilitate learning and determine appropriate interactions that are creative, innovative, and engage students to explore further.

Two tools that assist the development of content are templates and authoring tools. Templates are documents with a preset format prescribed and defined by the Style Guide. They are used as a starting point for content design so that the format does not have to be recreated each time it is used. Authoring tools are software applications that aid in the creation of content for a particular delivery media, such as Macromedia Dreamweaver MX and Flash MX. Again, interoperability and usability considerations must be threaded throughout the development process.

### 1.6.4 Implementation

In the Implementation phase, the course is tested and deployed for use by the desired audience. In this phase, the course is tested to ensure that the components function as designed within the current environment. The development team may employ tools such as an implementation checklist to validate a successful implementation and identify anomalies that must be addressed before full deployment of training content.

The following activities are addressed in this phase (if applicable):

- Running and testing of the system in the specified environment (system and user acceptance testing)
- Planning for coordination and management of the training program

### 1.6.5 Evaluation

The Evaluation phase serves as the quality management component for training development and ensures that the course functions as designed through evaluations with actual end users. Surveys and questionnaires address training issues such as:

- Did students like the instructional experience?
- Did students achieve the goals that were set out for the instruction?
- Were students able to transfer what they learned in class out in the real world?
- Was there any long-term return on the investment in the instructional experience?

The answers to these important questions allow the instructional designer to perform two critical functions: 1) Certify that learning has actually occurred as result of the instructional experience they created; and 2) identify gaps in student performance that need to be addressed with additional training or enhancements and modification to existing content.

The importance of this phase cannot be understated. It is through this phase that results and lessons learned from user feedback can be captured and distilled. By analyzing these results, action plans can be defined to inform future course development efforts - thus "closing the loop" of the ADDIE process. ODP is making significant strides in this area to build a systematic evaluations function to support continuous improvement across its programs.

## **2.0 Delivery Methods Analysis Tool (DMAT)**

### **2.1 Overview**

The primary elements of the Delivery Methods Analysis Tool (DMAT) include the following:

- Training Delivery Strategy Tool
- Media and Technology Selection Tool

### **2.2 Purpose**

The DMAT includes a methodology to:

- Capture course information that can be used to make decisions about how to approach, design, and deliver course content and materials.
- Identify course modules and their instructional considerations as an initial step in the process of determining an appropriate delivery strategy for each module.
- Provide media and technology considerations for each of the following: Face-to-Face, Interactive Video Teletraining (IVT) including both live and videotaped broadcasts, videoconferencing (VC), Web-based training (WBT), asynchronous self-paced and synchronous, computer-based training (CBT) via CD-ROM, audio conferencing, and print-based/self-paced learning modules.
- Provide a framework for selecting appropriate delivery media or technology for course modules.

### **2.3 Training Delivery Strategy Tool**

This section discusses the need to assess course content (from the perspective of strategies, concepts, and tested practices) to define modules that are appropriate for Blended Learning delivery. Specific course elements that will be addressed here include: Audience composition, course goals and objectives, course modules, content allocation, course prerequisites, course participant preparation, course follow-up, and course assessment and evaluation.

#### **2.3.1 Audience Composition**

The number of participants, their job duties, knowledge, experiences, and learning styles constitute a profile by which better decisions can be made about course development and delivery. This profile is used to inform the development and delivery process to maximize learner understanding, retention, and application.

### 2.3.1.1 *Considerations for analyzing audience composition*

1. Approximately, how many participants will attend each session? \_\_\_\_\_

2. Who is your target audience? Check all that apply.

Directors

Senior Executives

Mid-level Managers

First Line Supervisors

Entry Level Personnel

Systems/Technical Professionals

Program and Administrative Support

Other (please specify) \_\_\_\_\_

3. Will the audience be mixed (see positions checked above)?

Yes (if yes, briefly describe how this will affect your training goals):

\_\_\_\_\_

\_\_\_\_\_

No

4. What is the general skill or knowledge level of participants? For example:

Secondary education only

Undergraduate course work

Graduate course work

Professional certificates, qualifications, course work, etc.

Specialized training

5. What is the participant skill or knowledge level (from training, on-the-job training, other relevant experience) in the specific area covered by the course topic?

High

Medium

Low

6. What is the participant level of technology "literacy"?

High

Medium

Low

7. What is their experience level with Distance Learning technology?

High

Medium

Low

8. What are characteristics of your learners? Check all that apply. For example:

- |   |                                |
|---|--------------------------------|
| <input type="checkbox"/> Eager  | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Overdue for training                                     | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Fear losing job  | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Hostile  | <input type="checkbox"/> _____ |
| <input type="checkbox"/> New position   | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Need new skills to incorporate a new program or policies | <input type="checkbox"/> _____ |

9. Why are participants taking this course? Check all that apply.

- Required by statute
- Required by supervisor
- Selected by participant for professional development
- Encouraged by division providing training
- Other (please specify) \_\_\_\_\_

10. How will they apply what they learn through this course to their jobs? Check all that apply.

- Immediate information and skills
- Medium-term knowledge and understanding
- Other (please specify) \_\_\_\_\_

**2.3.2 Course Goals and Objectives**

To effectively present training information, increase knowledge and understanding, and promote skill-building, training developers must be able to clearly express what they expect participants to learn. This section of the tool assists users in identifying specific course goals and objectives.

**2.3.2.1 Goals**

Course goals describe broad, encompassing learning outcomes. For example, goal of this course is to:

- Increase knowledge and understanding about...
- Foster communication about and resolution of...
- Establish consensus on...
- Familiarize EES employees with...
- Introduce the concepts and theories related to...
- Expose participants to the principles of...

**Question:** What is the overall goal of this course?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2.3.2.2 Objectives

Course objectives describe precise behaviors participants will be capable of at the end of a course or session. Objectives are stated as specific, “hard” or action verbs. For example: By the end of this Mid-Career Retirement Planning course, participants will be able to:

- Identify federal retirement benefits
- Access information about time-sensitive relevant benefits
- Devise a personal financial plan

**Question:** What should participants be able to do after they complete the course?

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2.3.3 Course Modules

Course modules represent information that can stand-alone as a lesson or session. This part of the tool helps users to segment training information, so that it is easier for learners to grasp and retain. Modularizing content also aids the training developer in identifying content for a distinct method of training.

2.3.3.1 Considerations for analyzing course modules

11. What are the major subtopics of the course?

1.	5.
2.	6.
3.	7.
4.	8.

12. Is there enough information for each of the above subtopics to justify a module?

Yes  No

13. If not, are there subtopics that naturally can be grouped together?

Yes  No

If yes, which ones?

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14. What are the learning objectives of each module? What should participants be able to do after they complete Module 1?

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15. What should participants be able to do after they complete Module 2?

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(Continue on back, if needed.)

16. Do each module's objectives appear to be distinct from one another, and important and substantive enough to stand on their own as subject matter?

Yes  No

17. Is there a logical start and end to each module?

Yes  No

18. Is there a logical connection from one module to the next?

Yes  No

### 2.3.4 Content Allocation and Course Compression

This section of the tool aids the user in identifying essential, optional, and supplemental information.

Course compression often takes place when existing course materials that are delivered in a face-to-face environment (i.e., workshop or seminar) are converted to a distance learning format (i.e., IVT, Web, etc.). Compression occurs for two reasons: First, course content is streamlined and divided into modules containing only content that is specific to that module's learning objectives. Secondly, module content is restructured and reorganized for the specific format of the delivery technology. For example, content is compressed when converted to Web-based training because it is not delivered linearly as in a face-to-face format.

#### 2.3.4.1 Considerations for content allocation and course compression

19. For each module, what information is essential (list below, or highlight on content outline)?

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20. What information is not essential (strike out on outline, or make mental note)?

21. What information is optional, should there be time or the opportunity available to include it?

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22. What information is likely to trigger participant questions and comments?

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23. What information could be provided before or after the core course delivery through another format or as supplemental material?

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24. Does the compression of content above reorganize or restructure the modules identified in the previous section?  Yes  No

### 2.3.5 Course Prerequisites

This section highlights considerations for identifying previous experience, training, or education needed before training begins.

Considerations for analyzing course prerequisites:

25. What previous experience, training, or education should participants have to take this course? For example:

Specific knowledge and experience:

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Completions of a previous training course:

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26. What are the exceptions, if any, to this course's standard prerequisites? For example:

Educational background may replace prerequisites

Similar experiences may replace prerequisites

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### 2.3.6 Course Participant Preparation

Course preparation is pre-course materials (i.e., questionnaires, exercises, self-assessments, or video tapes) or a pre-course learning event (i.e., audioconference or online conference) that the participant is required or recommended to complete before attending a course. The content of the materials or learning event are directly relevant to and part of the course content to be delivered and increased participant learning readiness for course content.

#### 2.3.6.1 Considerations for analyzing participant preparation

27. How important is setting participant expectations before the course?

- Very
- Somewhat
- Not very

28. Would participants benefit from seeing some portion of course content before the course?

Yes  No

If yes, what portion(s)?

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### 2.3.7 Course Follow-up

This section of the tool enables users to capture course follow-up elements including:

- Addressing question-and-answer or discussion overflow
- Providing clarification/increasing understanding
- Supporting the transfer of new knowledge or skills to the job
- Providing additional details and examples

#### 2.3.7.1 Considerations for analyzing course follow-up:

29. Is there course information that is likely to trigger more questions than time allowed during the scheduled session?  Yes  No

If yes, list:

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30. Is there information that might require clarification or elaboration?

Yes  No

If yes, list:

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31. Are there topics that might require more details and examples?

Yes  No

If yes, list:

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32. Is this information provided in other supplemental training materials (i.e. workbook, information on the agency Intranet)?

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**2.3.8 Course Assessment: Evaluation**

Feedback and evaluation data from end users supports continuous program improvement. This section of the tool helps users to understand the process and structure for assessment and evaluation of course content for future improvement. Considerations for analyzing course assessment include the following:

33. What do you expect to learn from course evaluation?

- Level 1: Participant reaction/satisfaction
- Level 2: Learning effectiveness
- Level 3: Ability to apply learning/behavior
- Level 4: Results of application

34. How will evaluation results be noted and passed along to course instructors or managers? For example:

- Copies of evaluation forms made available
- Synthesis and interpretation of evaluation forms made available
  - Verbal
  - Written

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35. How will evaluation data be used to improve the course? For example:

- Coaching
- Presenter/Instructor integrate on own

Course team meets and integrates evaluation results into process before the next course delivery

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## **2.4 Media and Technology Selection Tool**

The selection of appropriate media and technology for a specific course module is an essential element of effective and efficient use of Distance Learning technologies. The Media and Technology Selection Tool provides criteria that should be evaluated for each delivery technology to identify those that are most appropriate for the specific module being considered. Additional references regarding development timeframes, instructional strategies, and delivery costs will also be provided. This tool should be implemented after completing the Training Delivery Strategy and identifying a specific module for media selection analysis.

### **2.4.1 Decision Tree Process of Media Selection**

This section discusses how the Media Selection Tool uses a “decision tree” process to guide users to the most appropriate delivery technology for each course module. It identifies when and how the tool should be used, including “knock-out” questions that indicate the delivery technology being considered does not meet the delivery needs of the specific module.

#### *2.4.1.1 When and How to Use the Media and Technology Selection Tool*

The Media and Technology Selection Tool is one of a number of “how-to” Distance Learning materials and learning opportunities custom-designed for program managers, training coordinators, instructors, and other staff involved in DL related programs. Ideally, this selection tool should be read and implemented after

- Determining training topics by (a) needs assessment(s),
- Completing the Training Delivery Strategy Tool worksheets, and
- Identifying course modules.

The Selection Tool guides the user to the most appropriate delivery technology for each course module and is designed to be used in the follow manner:

- After course modules have been identified, the Media and Technology Considerations section of this tool should be completed for EACH module.
- Users should answer questions for each technology in the following order: Face-to-Face, Interactive Video Teletraining, Video and Web-Based Conferencing, Web-based Training, Computer-Based Training, Audio Conferencing, and Print-Based/Self-Paced (pp. 3-10).
- Questions should be answered YES or NO in the order presented.

For some questions, direction is given to go to another delivery technology if a negative answer is provided. These “knock-out” questions indicate that the delivery technology being considered does not meet the delivery needs of the specific module and a more appropriate delivery technology should be considered.

For example, if the question below is answered NO, then the user would stop answering questions for IVT - Videotape Considerations and go to the WBT Considerations. The user would continue answering questions in the WBT Considerations section to determine if it is a more appropriate delivery technology.

IVT - VIDEOTAPE CONSIDERATIONS			
Is the use of motion video necessary to achieve the module’s learning objectives?	YES	NO	If NO, go to WBT Considerations.

Once finished answering all appropriate questions, the user should count the number of YES answers for each delivery technology and write the number in the appropriate place on the Media and Technology Summary Results (pp. 11-12).

#### 2.4.1.2 *Understanding Summary Results*

The Media and Technology Summary Results provide a framework for recommending technologies that are appropriate for the delivery of a specific course module. This is why it is so important to break the course into modules as specified in the Training Strategy Tool. The more YES answers, the more likely the technology is appropriate for delivery of the module. Selecting appropriate delivery media/technology can immensely increase learning, retention, and implementation of necessary skills.

However, it should be noted that although a blended approach to delivery technologies is encouraged, it is important to resist the temptation to select too many different delivery media and technology, especially in the planning phase. The “bells and whistles” syndrome can come back to haunt you when planning becomes development and you are confronted with the time, energy, and complexities of integrating multiple technologies.

#### 2.4.2 **Media and Technology Considerations**

This section provides a series of Yes/No questions for each of the following technologies:

<b>FACE TO FACE CONSIDERATIONS</b>			
1. Is live audio interaction between the presenter and participants necessary to achieve the module's learning objectives?	YES	NO	If NO, go to WBT Considerations
2. Is it necessary to have both live <i>audio and visual</i> interaction between the presenter and participants?	YES	NO	If NO, go to Audioconference Considerations.
3. Is there budget allocated to cover the costs associated with the travel required for presenters and participants to attend the training event?	YES	NO	If NO, go to IVT Considerations.
4. Is it possible for the presenter(s) to be at the same location at the same time for the training event?	YES	NO	
5. Will the module be offered to a small number of participants?	YES	NO	
6. Are all of the participants at or near the same location?	YES	NO	
7. Does the module's content require the presenter to observe and certify the participants' ability to perform a specific action or task (e.g. firearms training)?	YES	NO	
8. Do the module's learning objectives require the participant to learn to use equipment or tools that are located in one region or at only one site?	YES	NO	
<b>IVT CONSIDERATIONS</b>			
1. Is live interaction between the presenter and participants necessary to achieve the module's learning objectives?	YES	NO	If NO, go to WBT Considerations.
2. Is it necessary to have live audio interaction between the presenter and participants to achieve the module's learning objectives?	YES	NO	
3. Is it necessary to have both live audio and visual interaction between the presenter and participants?	YES	NO	If NO, go to Web Conferencing Considerations.

4. Is it sufficient for participants to be able to see the presenter live without the presenter being able to see the participants?	YES	NO	If NO, go to VC Considerations.
5. Will the module be offered to a large number of participants?	YES	NO	If NO, go to VC Considerations.
6. Are the participants at many different locations?	YES	NO	
7. Is it sufficient to have participants interact live with each other through audio only or in small groups at local sites?	YES	NO	If NO, go to VC Considerations.
8. Are the module's learning objectives primarily cognitive (fact-based knowledge)?	YES	NO	If NO, go to VC Considerations.
9. Will the module's learning objectives be achieved through group, interactive instructional strategies such as Question and Answer sessions?	YES	NO	
10. Will instructional strategies such as demonstrating, modeling behaviors, and illustrating concepts enhance the module's content?	YES	NO	
11. Will the module materials include explanations with a high level of visualization?	YES	NO	If NO, go to VC Considerations.
12. Will the module materials include the use of any of the following media? <ul style="list-style-type: none"> <li>• Videotape/animation</li> <li>• CD-ROM</li> <li>• Graphics of pictures, images, or concepts</li> <li>• PowerPoint or Presentations slides</li> <li>• Computer applications</li> </ul>	YES	NO	
13. Is it necessary to have live access to experts during the module delivery?	YES	NO	
14. If experts are not at the local site, is it sufficient for the presenter and participants to interact live with them through audio only?	YES	NO	If NO, go to VC Considerations.
15. Is the content of the module time-sensitive or JIT (Just-In-Time) information?	YES	NO	

16. Is it desirable to videotape the delivery of the module for later viewing?	YES	NO	
<b>VIDEO CONFERENCING CONSIDERATIONS</b>			
1. Is live interaction between the presenter and participants necessary to achieve the module's learning objectives?	YES	NO	If <i>NO</i> , go to WBT Considerations.
2. Is it necessary to have live audio interaction between the presenter and participants to achieve the module's learning objectives?	YES	NO	
3. Is it necessary to have both live audio and visual interaction between the presenter and participants?	YES	NO	If <i>NO</i> , go to Web Conferencing Considerations.
4. Do participants have access to a VC system on site or within easy local travel distance?	YES	NO	If <i>NO</i> , go to Web Conferencing Considerations
5. Will the module be offered to a small number of sites?	YES	NO	
6. Will the module be offered to a limited number of participants?	YES	NO	
7. Is it necessary to have live access to experts during the module delivery?	YES	NO	
8. Is it necessary to have live interaction—both visual and audio—with experts who may be at different locations?	YES	NO	
9. Is it necessary for participants to have extensive, live interaction—both visual and audio—with other participants not at their location?	YES	NO	
10. Will the module materials include any of the following media? <ul style="list-style-type: none"> <li>• Graphics of pictures, images, or concepts</li> <li>• PowerPoint or Presentations slides</li> <li>• Whiteboard</li> <li>• Videotape</li> <li>• Audio</li> <li>• Internet/World Wide Web</li> </ul>	YES	NO	

11. Is the content of the module time-sensitive or JIT (Just-In-Time) information?	YES	NO	
<b>WEB CONFERENCING CONSIDERATIONS</b>			
1. Is live interaction between the presenter and participants necessary to achieve the module's learning objectives?	YES	NO	If NO, go to WBT Considerations.
2. Do participants have access to Web conferencing software at their desktop or at a local site??	YES	NO	If NO, go to Audioconference Considerations.
3. Is it necessary to have live audio interaction between the presenter and participants to achieve the module's learning objectives?	YES	NO	
4. Will the module be offered to a limited number of participants per session (less than 20)?	YES	NO	
5. Is it necessary to have live access to experts during the module delivery?	YES	NO	
6. Is it necessary to have live interaction with experts who may be at different locations?	YES	NO	
7. Is it necessary for participants to have extensive, live interaction with other participants not at their location?	YES	NO	
8. Is it necessary for participants to discuss the training content in breakout sessions?	YES	NO	
9. Will the communication dialogue need to be captured and distributed?	YES	NO	
10. Will the module materials include any of the following media? <ul style="list-style-type: none"> <li>• Graphics of pictures, images, or concepts</li> <li>• PowerPoint or presentations slides</li> <li>• Whiteboard</li> <li>• Videotape</li> <li>• Audio</li> <li>• Internet/World Wide Web</li> </ul>	YES	NO	
11. Will participants need to share software applications or collaborate on a shared document?	YES	NO	

12. Will participants need to post ideas to a shared whiteboard?	YES	NO	
13. Will it be helpful to poll or survey learners during instruction?	YES	NO	
14. Is the content of the module time-sensitive or JIT (Just-In-Time) information?	YES	NO	
15. Will it be necessary to add or modify content just before instruction or "on the fly"?	YES	NO	
<b>WBT CONSIDERATIONS</b>			
1. Can this module be delivered without live instructor facilitation?	YES	NO	
2. Can this module be delivered primarily as text with some supporting media such as flash animation, graphic images and minimal audio files?	YES	NO	If <i>No</i> , return to IVT Considerations
3. Will the module be offered to a large number of participants?	YES	NO	
4. Do the participants have access to the Internet or Intranet?	YES	NO	If <i>NO</i> , go to CBT Considerations.
5. Would participants benefit from the opportunity to discuss and exchange information with the presenter and other participants?	YES	NO	If <i>NO</i> , go to CBT Considerations.
6. Is it necessary for course managers or administrators to capture administrative information and data from each participant, such as recording and reporting on participants' progress?	YES	NO	
7. Do participants require the flexibility to progress at their own pace, opt out of material they are already familiar with, and revisit any material as a reference or job aid as they determine necessary?	YES	NO	
8. Does the content of the module need to be delivered uniformly and consistently?	YES	NO	
9. Is the current module or training material primarily print-based?	YES	NO	

10. Is it necessary to update and change the content of the module frequently?	YES	NO
11. Can the module's learning objectives be achieved primarily through independent study?	YES	NO
12. Is it sufficient for the presenter and the participants to primarily interact asynchronously?	YES	NO
13. Is it necessary for participants to have access to training material or module content prior to the delivery of other modules, such as a course syllabus, outline, or handouts?	YES	NO
14. Do participants require easy access to any of the material as a job aid or refresher?	YES	NO
15. Is it necessary to provide participants with on-line support resources and information in addition to the content of the module?	YES	NO
<b>CBT CONSIDERATIONS</b>		
1. Can this module be delivered without live instructor facilitation?	YES	NO
2. Is the content of the module static, with a relatively long life span?	YES	NO
3. Are the module's learning objectives performance-based?	YES	NO
4. Can the module's learning objectives be achieved through independent study?	YES	NO
5. Can the module's learning objectives be achieved through task repetition, mastery, and practice?	YES	NO
6. Are participant responses required to be immediately evaluated and non-instructor feedback given for the participants to continue with the instruction?	YES	NO
7. Do participants require the flexibility to progress at their own pace, opt out of material they are already familiar with?	YES	NO
8. Do participants require easy access to any of	YES	NO

the material as a job aid or refresher?			
9. Is it desirable to provide participants with resources and information in addition to training?	YES	NO	
<b>AUDIOCONFERENCE CONSIDERATIONS</b>			
1. Is live interaction between the presenter and participants necessary to achieve the module's learning objectives?	YES	NO	If <i>No</i> , return to WBT Considerations
2. Is it sufficient for the presenter and participants to interact through audio only?	YES	NO	If <i>No</i> , return to IVT Considerations
3. Does the module delivery require short-lead time with low costs?	YES	NO	
4. Is it desirable to deliver the module using familiar technology?	YES	NO	
5. Is it necessary to have live access to experts through audio only during the module delivery?	YES	NO	
6. May module content include the clarification and/or elaboration of previously delivered module content?	YES	NO	
7. Is module content time-sensitive or JIT (Just-In-Time) information?	YES	NO	
8. Are the module materials print-based?	YES	NO	
9. Is it necessary to update and change the module materials?	YES	NO	
10. Is it desirable to record the delivery of the module for later listening?	YES	NO	
<b>SELF-PACED / PRINT-BASED CONSIDERATIONS</b>			
1. Is it sufficient for the participants to complete this module on their own without instructor direction?	YES	NO	If <i>NO</i> , go to IVT Considerations.
2. Is this module's content outside of required curriculum?	YES	NO	

3. Is it sufficient for participants to complete this module at their own pace?	YES	NO
4. Is there a varied number of participants at different locations who would benefit from taking this module?	YES	NO
5. Is the content of the module highly personalized and not appropriate for group instruction?	YES	NO
6. Does the module need to be available where computer connectivity may not be present?	YES	NO
7. Is the content of the module suitable for a desk reference or job aide?	YES	NO
8. Will the module include materials that are primarily paper-based or in an electronic format that can be emailed, down-loaded and printed?	YES	NO
9. Will the module materials include any of the following support media? <ul style="list-style-type: none"><li>• Videotape</li><li>• Pre-recorded audio</li><li>• Graphics of pictures, images, or concepts</li><li>• Internet/World Wide Web</li></ul>	YES	NO

### 2.4.3 Summary Results

The Media and Technology Analysis Summary highlights decisions made in the tool and provides a framework for recommending technologies that are appropriate for delivering a specific course module. The section also warns against the temptation to select too many different delivery media and technology, which can lead to complexities in integrating multiple technologies, as well as a learning environment that is overwhelming and confusing to the learner.

<b>Face-to-Face Summary Results</b>	
Total YES answers to Face-to-Face Considerations	<b>Recommendation</b>
	A total of <b>5</b> or more YES answers to Face-to-Face considerations questions indicates that Face-to-Face is likely an appropriate delivery technology for the module considered.

<b>IVT Summary Results</b>	
Total YES answers to IVT Considerations	<b>Recommendation</b>
	A total of <b>10</b> or more YES answers to IVT considerations questions indicates that IVT is likely an appropriate delivery technology for the module considered.

<b>VTC Summary Results</b>	
Total YES answers to VTC Considerations	<b>Recommendation</b>
	A total of <b>8</b> or more YES answers to VTC considerations questions indicates that VTC is likely an appropriate delivery technology for the module considered.

<b>Web Conferencing Summary Results</b>	
Total YES answers to WC Considerations	<b>Recommendation</b>
	A total of <b>9</b> or more YES answers to WC considerations questions indicates that Web Conferencing is likely an appropriate delivery technology for the module considered.

<b>WBT Summary Results</b>	
Total YES answers to WBT Consideration	<b>Recommendation</b>
	A total of <b>7</b> or more YES answers to WBT considerations questions indicates that WBT is likely an appropriate delivery technology for the module considered.

<b>CBT Summary Results</b>	
Total YES answers to CBT Considerations	<b>Recommendation</b>
	A total of <b>6</b> or more YES answers to CBT considerations questions indicates that CBT is likely an appropriate delivery technology for the module considered.

<b>Audioconference Summary Results</b>	
Total YES answers to Audio conference Considerations	<b>Recommendation</b>
	A total of <b>5</b> or more YES answers to Audio conference considerations questions indicates that Audio conference is likely an appropriate delivery technology for the module considered.

<b>Self-Paced Print-Based Summary Results</b>	
Total YES answers to Self-Paced Print-Based Considerations	<b>Recommendation</b>
	A total of <b>4</b> or more YES answers to Self-Paced Print-Based Considerations questions indicates that Self-Paced Print-Based is likely an appropriate delivery technology for the module considered.

#### **2.4.4 Additional References**

In addition to the Training Delivery Strategy and the Media and Technology Selection tools, two additional reference documents will support users as they determine an appropriate delivery technology. The Distance Learning Technologies Matrix examines the characteristics, advantages, and disadvantages of each delivery technology. The Distance Learning Glossary identifies select terminology used in both tools. Users will have access to both documents as they complete the tools.

#### **2.4.5 Conclusion**

Upon completion of the DMAT, course content will be properly segmented into modules and lessons and topics with associated learning objectives. Media and technology considerations will have been identified with suggested delivery strategies.

Designers should now have the material they need to create a detailed course outline. As stated in the Blended Learning Strategy Document, this outline serves as the foundation for the complete course and guides the designer to organize content considering knowledge of the target audience, the course goals and objectives, and any resources materials, including information obtained from subject matter experts (SMEs). Objectives and activities are grouped and sequenced according to learning level hierarchy.

The analysis phase of the ADDIE model is complete and the Design phase begins to create the “blueprints” for the instructional experience.

## **3.0 Web-based Training Style Guide**

### **3.1 Introduction**

#### **3.1.1 Purpose**

The purpose of this Style Guide is to provide the ODP Training Partners with recommended Web-based Training (WBT) courseware design and development guidelines. The Style Guide provides generally accepted WBT strategies and best practices for navigation, user interfaces, design and development processes and tools, instructional strategies, and courseware development and delivery.

#### **3.1.2 Audience**

The intended audience for this Style Guide is the ODP Training Partners. Specifically, those users include institute directors/deputies, project managers, content designers and developers, graphic artists, and programmers.

#### **3.1.3 Structure**

This Style Guide will serve as a reference document for ODP Training Partners when designing WBT courses. A brief description of each document section is listed below.

- Section 3.1, Blended Learning Strategy, introduces the Style Guide.
- Section 3.2, Overview of the Web-based Course Development Process, provides a high-level description of WBT.
- Section 3.3, Design Strategies and Best Practices, presents strategies and best practices that support the instructional design process.
- Section 3.4, Development Strategies and Best Practices, provides an overview of WBT design, development, and production standards.
- Section 3.5, Delivery Environment Strategies and Best Practices, addresses technical considerations pertaining to the delivery of Web-based content.
- Section 3.6, Process and Best Practices, presents the recommended course development process and corresponding templates.
- Appendices, provides supplemental document and storyboard templates, a glossary, and process checklists.

### **3.2 Overview of the Web-based Course Development Process**

#### **3.2.1 What is Web-based Training?**

Web-based Training (WBT) is a form of computer-based training in which the training material is accessed via the World Wide Web (WWW). WBT presents live content in a structure that allows self-directed, self-paced instruction for any topic. WBT is media-rich training fully capable of evaluation, adaptation, and remediation, across various computer platforms. Typical media elements used in

this environment include text, graphics, photographs, animations, video, and audio.

WBT is often a viable training solution offering:

- Flexibility and convenience – users can access training when they want and at their own pace
- Cross platform functionality – training can be accessed from various computer platforms
- Web-browsers and Web accessibility – most computers include either Microsoft's Internet Explorer or Netscape Navigator and have a direct connection to an Intranet/Internet
- Lower cost for distribution – training is delivered via the Web
- Availability – users dispersed over a large geographic area can complete the training without incurring any travel expenses
- Simplicity – changes and updates to training can be implemented from one location

### **3.2.2 The Instructional Systems Design Process**

Instructional Systems Design (ISD) is the systematic process of translating principles of learning and instruction into plans for effective, efficient, and relevant instructional materials, activities, and programs. This process consists of interrelated phases that work together toward a defined goal and ensures that training is developed to meet measurable outcomes. The suggested tool for use in Analysis, Design, Development, Implementation, and Evaluation phases of WBT course development is the ADDIE model.

The ADDIE model provides a blend of various documented ISD course development processes. This model supports five phases of WBT course development. These include:

- Analysis
- Design
- Development
- Implementation
- Evaluation

#### **3.2.2.1 Analysis**

The Analysis phase serves as the baseline for the course development process. The main purpose of analysis is to perform a systematic exploration of the way learners are currently performing a process and the way that process should be performed. This difference is called a performance gap. Analysis helps ensure that training is the appropriate solution. The product of this phase is the foundation for all subsequent development activities. The following is defined in the Analysis phase:

- Who and what must be trained

- When the training will occur
- Where the training will take place

The following tasks are completed during the Analysis phase:

- Needs Assessment
- Task Analysis
- Definition of Objectives
- Course Detailed Outline

### 3.2.2.2 *Design*

After the Analysis phase is complete, the instructional designer creates the “blueprints” of the instructional experience. This is known as the Design phase. In this phase, the instructional designer plans the elements of instruction. Supporting documentation includes:

- Course Design Plan
- Storyboards
- Evaluation Plan

### 3.2.2.3 *Development*

When the Design phase is complete, development begins. Development is the production phase of the ADDIE process, where ideas and content generated during the Design phase are given life. It is during this phase that graphics are created, video is captured, photographs are taken, animations are created, and the course is programmed and assembled.

### 3.2.2.4 *Implementation*

The Implementation phase may also be called roll out or execution. In this phase, the course is tested to ensure it functions correctly in the client environment. The implementation team will validate functionality and identify any issues that must be resolved prior to full deployment of the course. Specifically, The Implementation phase involves:

- Testing the course in the client environment
- Preparing a plan for the coordination and management of the course

### 3.2.2.5 *Evaluation*

The Evaluation phase serves as the quality management component for training development and ensures that the course functions as it was designed through evaluations with end-users. Surveys and questionnaires are used to collect feedback and answer training related questions, such as:

- Did the learners achieve the objectives that were defined for the instruction?
- Did the learners like the instructional experience?

- Were the learners able to transfer what they learned in class out in the real world?

An additional evaluation can occur 6-12 months following training. This evaluation determines if there is a long-term return on investment from the instructional experience.

The answers to these important questions enable instructional designers to certify that learning has or has not occurred as result of the course they created.

### 3.3 Design Strategies and Best Practices

#### 3.3.1 Overview

This section will present strategies and best practices that support the instructional design process.

#### 3.3.2 Needs Analysis

A thorough needs analysis is critical to guaranteeing that the course material addresses the learners' needs. There are two components of a needs analysis. They are:

- Needs Assessment  
Needs assessment involves analyzing the target audience, the learning and work environment, and completing the five-step process for determining a training need.
- Task Analysis  
Task analysis involves breaking down and organizing the proposed learning material and determining objectives to meet the training needs

##### 3.3.2.1 Needs Assessment

The ODP Training Strategy provides brief descriptions of a training need and needs assessment. "A training need is a need for human performance improvement that can best be met by training..."<sup>2</sup> Needs assessment is the process of determining if there is a need to improve performance and, if so, in what area and to what extent. A critical element of the needs assessment is the identification of "the differences between the ideal and the actual characteristics"<sup>3</sup>

Conducting a thorough needs assessment is critical to the development of a successful training product. A needs assessment is conducted in order to:

- Establish entry behaviors and performance levels of potential learners
- Agree on the desired outcomes, or terminal behaviors, expected of the participants following training

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<sup>2</sup> Peterson, Robyn. (1998). Training Needs Assessment: Meeting the Training Needs for Quality Performance, 2<sup>nd</sup> Ed. London: Kogan Page, p. 8-9.

<sup>3</sup> Kern, David E., Patricia A. Thomas, Donna M. Howard, and Eric B. Bass. (1998). Curriculum Development for Medical Education: A Six-step Approach. Baltimore: Johns Hopkins, p. 20.

### 3.3.2.1.1 Audience Analysis

Conducting an audience analysis guarantees the instructional designer develops appropriate learning material for the WBT. The instructional designer needs to determine the significant characteristics of the target audience. These characteristics may include but are not limited to:

- Reading and education level
- Computer and Web skills
- Experience with the proposed training material
- Job descriptions

### 3.3.2.1.2 Environmental Analysis

An environmental analysis provides the instructional designer with insight into the target audience's learning and working environments. Conducting this sort of analysis enables the instructional designer to create a WBT course that will function correctly and accommodate the target audience's needs in the intended learning environment as well as reflect their work environment.

### 3.3.2.1.3 Five-step Process for Determining a Need

The standard model for conducting a thorough needs assessment involves following a five-step process. Adhering to this process is critical to creating accurate, relevant, and appropriate content for ODP courses.

The process steps are listed below<sup>4</sup>:

1. List the course goals. During this step, the instructional designer determines what learners must be able to do or know when they complete the course. The instructional designer determines how well the identified goals are being achieved by interviewing and observing people who are experts in performing the skills or having managers describe the type of knowledge or skill they wish their staff to possess.
2. Determine how well the identified goals are already being achieved. The instructional designer determines how well the identified goals are being achieved by observing people on the job, conducting assessments, or evaluating job performance. A combination of these techniques provides the most reliable estimate of the current level of performance of instructional goals.
3. Determine the gaps between "what is" and "what should be."  
In order to determine if there are learning gaps, the instructional designer identifies the gap between what learners should be able to do and what they are currently able to do for each identified goal.
4. Prioritize gaps according to agreed-upon criteria. The instructional designer uses the following criteria to assist with prioritizing learning gaps:

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<sup>4</sup> Smith, L. Patricia, and Tillman J. Ragan. (1993). Instructional Design. New York: Macmillan Publishing Company, p. 28-37.

- a. Gap size (addressing the biggest gap first)
  - b. Importance of the goal (working on the most critical goals first)
  - c. Number of learners affected (choosing those gaps that affect the most learners first)
  - d. Consequences of not meeting the goal (selecting those gaps having the most serious consequences if not closed first)
  - e. Probability of reducing the learning gap (attending to the gaps that have the greatest probability of being closed with the available resources first)
5. Determine which gaps are instructional needs and which are most appropriate for design and development of instruction.  
The instructional designer needs to be careful not to assume that a poor performance in learning tasks implies a need to correct or revise training. For example, a high rate of learner absenteeism or insufficient equipment for learners to perform their job may be the cause of poor work performance.

There are numerous tools that the instructional designer may use to accomplish the five-step process mentioned above and to ensure an accurate and complete needs assessment. Chapter 3 – Assessment of Training Needs to Determine Curricular Content, of the ODP Training Strategy identifies several tools and/or approaches for gathering requisite information from and about the target audience and proposed learning material for a given course. These additional tools and/or approaches, as adopted from Kern et al.<sup>5</sup> and Finch & Crunkilton<sup>6</sup>, include:

- Informal Discussions
- Formal Interviews
- Focus Groups
- Questionnaires
- Direct Observation
- Proficiency Tests

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<sup>5</sup> Kern, David E., Patricia A. Thomas, Donna M. Howard, and Eric B. Bass. (1998). Curriculum Development for Medical Education: A Six-step Approach. Baltimore: Johns Hopkins.

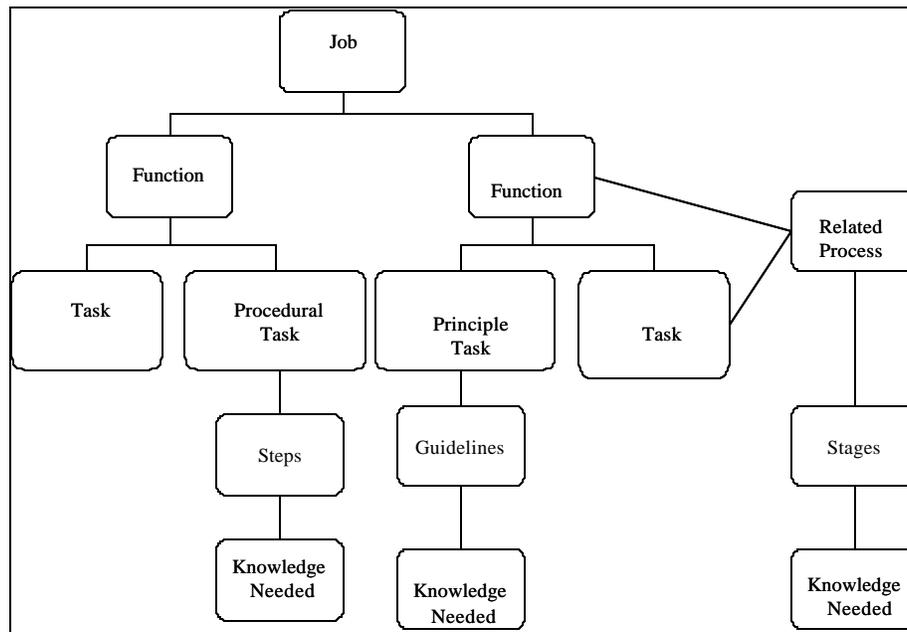
<sup>6</sup> Finch, Curtis R. and John R. Crunkilton. (1999). Curriculum Development in Vocational and Technical Education: Planning, Content, and Implementation. Boston: Allyn Bacon.

### 3.3.2.2 Task Analysis

One of the most reliable and accurate tools used during a needs analysis is the task analysis. The task analysis breaks down and organizes the proposed learning material, resulting in a list of measurable objectives describing what learners should know or be able to do upon completion of a given course. The objectives determine the skills, knowledge, and situations that must be developed and provide a framework for the content. The task analysis also assists the instructional designer with identifying any prerequisite skills or knowledge learners must possess prior to beginning a course to achieve the stated objectives.

Typical steps of a task analysis include determining prerequisites, identifying job functions, identifying tasks within each function, and determining the task as procedural, process or principle based. The outcome of this process is the identification of the skills and knowledge that will structure the training program. Figure 6 (below) provides an illustration of a sample task analysis.

**Figure 6. Sample Task Analysis**



The same tools the instructional designer uses during the needs assessment may also be used during a task analysis. These tools enable the instructional designer to capture the information required to ensure the development of a detailed task analysis.

### 3.3.3 Web-based Training Objectives

Objectives are defined during needs analysis when the instructional designer conducts the task analysis. Specifically, objectives are detailed statements of what the learners will be able to achieve or be able to demonstrate as a result of completing a course. Thus, objectives are statements of learner behavior. They describe the result of the learning process rather than what or how the learner will be taught.

Well-defined objectives:

1. Enable learners to know what is expected from them
2. Enable learners to see whether or not the instruction is effective
3. Provide guidelines for evaluation by specifying desired outcomes that are assessable
4. Stress the behavioral changes expected rather than attitudes or insights that cannot be measured

The instructional designer must be careful to use objectives appropriately. Objectives are not a description of:

1. Learning materials content
2. What the instructor says or does
3. A specific instructional experience

WBT objectives differ from standard objectives because they must be measurable by a course accessed via the Web. A course distributed over the Web cannot measure whether a learner “knows” or “understands” how to perform a specific task or “define” a term. WBT courses can enable learners to “identify” the proper steps to complete a task or a correct definition.

For a more thorough review of objectives, refer to Chapter 4 – Curriculum Development and Revision, of the ODP Training Strategy, this chapter also discusses the *Taxonomy of Educational Objectives*, i.e. Blooms’ Taxonomy.

### 3.3.3.1 *Terminal and Enabling Learning Objectives*

Objectives are often categorized according to the hierarchical level of the skills, behaviors, or tasks identified during the needs analysis. There are two commonly used levels of objectives, Terminal Learning Objectives (TLOs) and Enabling Learning Objectives (ELOs).

- **TLOs** - TLOs are objectives that correspond to the overall instructional goals of the course. TLOs describe what learners will be able to do at the end of the overall instructional course.
- **ELOs** - ELOs, also known as subordinate objectives, correspond to the skills that are required to accomplish the TLO. Specifically, they define the skills, knowledge, or behaviors that learners must master to successfully achieve the TLO.

### 3.3.3.2 *Writing Web-based Objectives*

Effective Web-based objectives are critical to the success of any WBT course because they ensure learners are mastering the training material in a non-traditional learning environment. The objectives must be measurable via the Web. Effective objectives, regardless of training delivery, are comprised of the following three parts:

- **Performance** - Performance expresses what the learner will do, usually as an action
- **Condition** - Condition expresses what learners are given, such as tools or resources

- **Criterion** - Criterion expresses how well learners must perform

#### 3.3.3.2.1 *The Performance*

The performance component of an objective is a statement of what the learner will be able to do. This component should be generated from the needs analysis and must include a clearly identifiable behavior. The objective must include a verb that is measurable over the Web and not open to a range of interpretations (e.g., it is impossible to measure or test whether a learner is aware of something or fully understands a concept via the Web). However, it is possible to test whether a learner is capable of selecting/identifying the correct concepts, list items, or labels. The objective must state specifically how learners will demonstrate what they know, understand, appreciate, etc.

Choose a measurable verb when describing what learners will be able to accomplish. For example, “The learner will be able to match each Emergency Level to its corresponding description.”

#### 3.3.3.2.2 *The Condition*

When the performance component is clearly defined, it may be necessary to state the important conditions under which the performance is to occur. The condition refers to the situation or scenario under which the learner will perform the behavior or performance. The condition can be defined by asking the following questions:

- What cues or conditions will learners need to accomplish the behavior?
- What resource material will learners need when performing the behavior?
- What will learners not be allowed to use?
- Will learners be given any special equipment or assistance?

For example, “Using the drop-down lists provided, the learner will be able to match each Emergency Level to its corresponding description.”

#### 3.3.3.2.3 *The Criterion*

After informing learners what they will be able to do (the performance) and what they can or cannot use to do it (the condition), they should be informed of how well to do it. The criterion is the degree or criteria component of the objective that describes to what degree learners will be evaluated. It is the standard learners should achieve. The criterion describes what is acceptable and also sets the criterion against which to assess the learners’ performance (e.g., how to judge the outcome of the behavior or performance). It is often stated in terms of the limits within which a behavior must fall. When writing the criterion component, ask the following question: “What level of mastery is required for learners to demonstrate mastery of the task?”

For example, “Using the drop-down lists provided, the learner will be able to match each Emergency Level to its corresponding description with 75% accuracy.”

### 3.3.3.2.4 Examples

Examples and non-examples of WBT objectives are provided in Table 3 (below). Each objective in the "Examples" column contains the three components of a good objective and most importantly is measurable over the Web. The objectives in the "Non-example" column are incomplete objectives and are not measurable over the Web.

**Table 3. Examples and Non-examples of WBT Objectives**

Examples	Non-examples
Given a list of potential crime scene protection procedures, first responders will be able to identify the proper steps required to protect a crime scene with 100% accuracy.	First responders will know how to properly protect a crime scene.
Given several different safety measures, public works employees will select those safety measures they need to employ in the event of a WMD incident with 100% accuracy.	Public works employees will understand how to employ proper safety measures in the event of a WMD incident.
Given a real life scenario, fire service personnel will be able to identify the proper steps involved with isolating and successfully terminating hazardous incidents with 100% accuracy.	Fire service personnel will isolate hazardous incidents.

## 3.3.4 Instructional Strategies

Instructional strategies provide an approach to organizing and presenting information. This section of the ODP Style Guide discusses the WBT Learning Taxonomy, Course Structure, and recommended WBT Design Strategies.

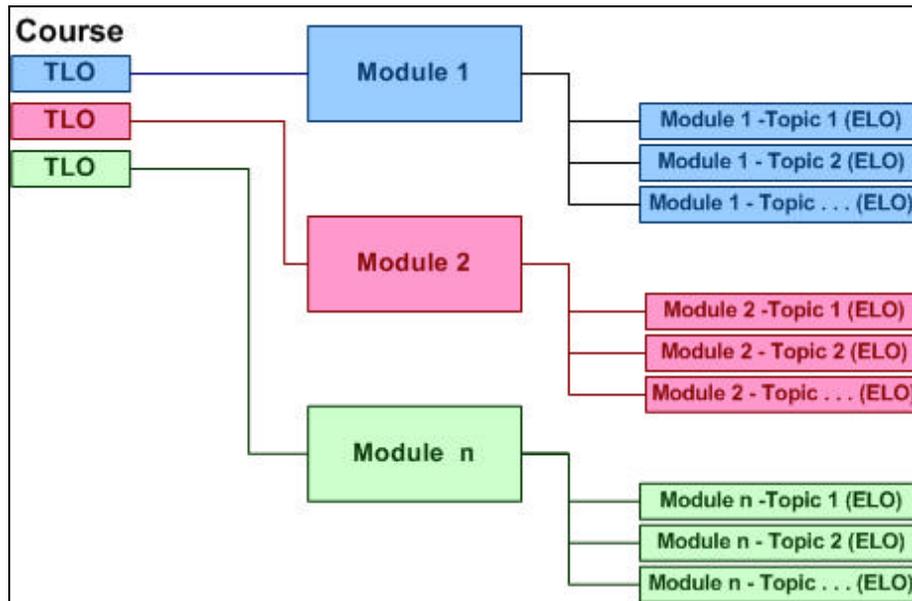
### 3.3.4.1 Web-based Training Learning Taxonomy

The WBT learning taxonomy serves as the foundation for the instructional strategies. It establishes a relationship between different course components, which may include modules, lessons, units, or topics. These components correspond directly to the course learning objectives. The WBT learning taxonomy for ODP courses has three components:

1. Course – associated with one or more terminal learning objectives or TLO
  - Modules – associated with one or more enabling learning objectives or ELO
    - Topics – associated with one ELO

Figure 7 (below) provides an illustration of this relationship.

**Figure 7. WBT Learning Taxonomy**



ODP courses will consist of modules, each containing a group of topics. Each topic is equivalent to one ELO. Module size is dependent upon the logical grouping of ELOs and the time required to complete a module.

### 3.3.4.2 Course Structure

Establishing a logical course structure is an important instructional strategy. Course content needs to be organized to ensure learners are able to complete the course without frustration or confusion. The recommended structure for all ODP courses is to organize content into Modules and Topics.

#### 3.3.4.2.1 Modules/Topics

The course should be organized into modules each of which are composed of separate topics. Each topic should have a stated objective and corresponding instructional content.

Each module of the WBT will include:

1. **Module Introduction and Objectives**  
These screens should include the module title, purpose and objectives.
2. **Topics (content and practice)**  
Each topic should be based on one ELO with a Practice Exercise every 3-5 screens.
3. **Module Summary**  
This screen should provide a summary of module topics and provide a transition to the next module.

#### 4. **Module Assessment**

This is a tool used to measure learners' mastery level of the material presented and should consist of questions related to the ELOs with a minimum of one question per ELO.

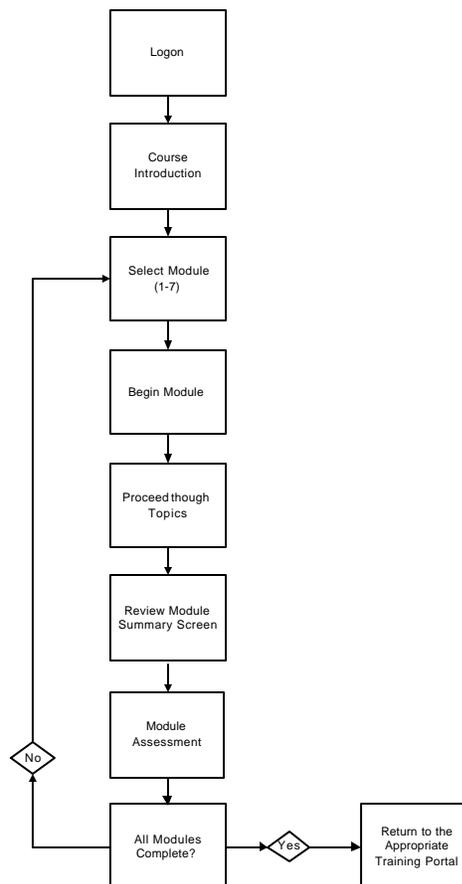
##### *3.3.4.2.2 Suggested Course Progression*

Described and illustrated below is a recommended course progression for ODP courses. This recommendation is based on industry best practices. When learners log on and begin an ODP course, they should be taken immediately to the Course Introduction. The course introduction should include the course purpose, overview, a description of the intended audience, and navigation instructions. Afterward, the learners can select modules sequentially to proceed through the course. After selecting a module, learners should complete all corresponding topics. Each topic should include content screens comprised of content specific and appropriate text, graphics, animations, pop-up information, Practice Exercises, and access to additional information (when necessary).

At the end of each module, a Module Summary screen should be presented. This screen should summarize topics contained within the module. After the Module Summary screen, learners should complete the Module Assessment. The Module Assessment is used to measure learners' mastery level of the material presented. When the learners complete all of the modules and corresponding assessments, they should return to the appropriate training portal.

Figure 8 (below) depicts a comprehensive flow through a standard ODP Web-based course:

**Figure 8. Course Progression**



### 3.3.4.3 Web-based Training Design Strategies

The requirements for effective WBT are different from the requirements for effective classroom training, Video Teletraining (VTT), or other types of instruction. The following strategies should be developed to ensure effective learner interaction within ODP courses:

1. **Course Design** - Describes the overall instructional approach for the course. The strategy includes using extended metaphors, scenarios, and supplemental materials.
2. **Course Assessment** - Describes the approach for Practice and Assessment items. Refer to section 3.3.5.3 (page 62) for more information concerning learning assessments.
3. **Module Design Strategies** - Describes the strategy for developing individual modules, to include module descriptions, module objectives, instructional strategies, module assessment strategies, and content outline.

The instructional strategy, as part of the module design strategy, defines how learning is presented through text and graphics. Table 4 (below)

describes the strategy examples for text and graphics presentation.

**Table 4. Instructional Strategy Examples**

Strategy	Definition
Complex Animation	A complex animation is one that attempts to depict a process. Complex animations require much more resources than simple animations. Examples include Virtual Reality or 3-D animations.
Graphic	Graphic refers to a static visual element. In a WBT course, both photographs and original artwork are used as graphics. In some cases, text is treated as a graphic, (i.e., a visual image rather than words). This happens most often with calculations or lists.
Graphic Build	A graphic build is a series of graphics shown in sequence or as overlays.
Label	A label is text included as part of a graphic or animation. It does not require an action by the learner in order to be displayed.
Pop-Up Text	Pop-up text appears in the graphic area of the screen on a cue given by the learner (either clicking on an item or rolling the mouse over an item).
Simple Animation	A simple animation is similar to a complex animation, but generally shorter in length and easier to produce (e.g., 2-D rather than 3-D animation).
Text Build	A text build is a series of text items shown in sequence. Text builds add text until the instruction is complete. Text builds never replace one set of text with another on a single screen.

### 3.3.5 Interactivity

Interactivity is a powerful tool used to support content and engage learners. The level of interactivity in a course corresponds directly to the type of material that is presented and the degree of learner involvement required for a course. Table 5 (below) illustrates the four levels of interactivity strategies and their corresponding descriptions.

**Table 5. Interactivity Strategy Levels**

Level	Description
Level I—Passive	The learner acts solely as a receiver of information. The learner is required to read the text on the screen, view graphics, illustrations, charts, and use the navigational buttons to progress forward through the program or move back. An example of this type of WBT product may also contain pop-ups and hyperlinks to Websites, materials, and other information interspersed between the text and graphic presentations
Level II—Limited Interaction	The learner makes simple responses to instructional cues. The WBT product includes learning activities listed in Level I as well as multiple choice and column matching related to the text and graphic presentation. A good example is a WBT product that includes these types of test items at the end of a unit of instruction to test the learner's grasp of the information.

Level III—Complex Participation	The learner makes a variety of responses using varied techniques in response to instructional cues. The responses may include those listed for a Level II –Limited Interaction as well as text entry boxes and manipulation of graphic objects to test assessment of the information presented. A good example of this type of WBT product is desktop software training requiring the learner to perform as though using the program
Level IV—Real-time Participation	The learner is directly involved in a life-like set of complex cues and responses. This involves engaging the learner in a simulation that mirrors the work situation with stimuli-and-response coordinated to the actual environment. An example of this type of WBT product is using artificial intelligence similar to computer games and flight simulators.

### 3.3.5.1 *Objective and Interactivity Level*

Table 6 (below) represents the six levels of objectives with their corresponding levels of interactivity. Interactivity strategies should be selected based on the level of objectives. Objective levels are determined by the following criteria:

1. Type of learning (e.g., knowledge, skill, or attitude)
2. Level of learning (e.g., fact, concept, process, procedure, or principle)

**Table 6. Level of Objective and Recommended Interactivity Level**

Level of Objective	Level of Interactivity
Knowledge	Level I & Level II
Comprehension	Level II
Application	Level II
Analysis	Level III
Synthesis	Level III
Evaluation	Level IV

### 3.3.5.2 *Guidelines for Interactivity*

When an interactivity strategy level is selected, the following guidelines should be used to implement the requisite level of interactivity for all ODP courses.

**Table 7. Guidelines for Interactivity**

Guideline Description	Explanation
Provide opportunities for interaction at least every three or five screens. However, mandatory interaction with the computer should not be superficial.	Without interaction, the course risks becoming an electronic page-turner. However, if an action required is unnecessary, the learner could be distracted by it and become frustrated. Learners prefer not to have unnecessary interactions.
Group the content into small segments and build in questions (with feedback), periodic reviews, and summaries for each segment.	Grouping content into smaller units and providing opportunities for interaction (e.g., questions) within each information segment allows learners to interact with the program more frequently.
Ask as many relevant questions as possible without interrupting the continuity of the instructional flow.	Questions should provide immediate feedback to learners regarding their own performance, and sustain learner attention by keeping them mentally engaged in the learning process.
Ask questions at the application level rather than at the memory level.	Application questions enhance attention and comprehension and facilitate transfer of learning.
Use rhetorical questions during WBT to get learners to think about the content or to stimulate their curiosity. Also use them as a natural transition between frames.	A rhetorical question is a question that does not require learners to overtly provide an answer. It invites learners to mentally interact with the content. Used as a transition aid, it can direct learners' attention to what is coming up next.
Consider designs where the learner is not presented with information in a linear format, but rather discovers information through active exploration in the program. Developers should consider structuring a course for learner exploration without a predetermined "order" to the learner's selection of modules and topics.	This approach adds variety, challenges learners, and maintains their interest.

### 3.3.5.3 *Costs Associated with the Different Interactivity Levels*

There are four levels of interactivity. Description of each level can be found in Table 5 (page 56). Factors that affect the cost of interactivity are listed below:

- Desired amount of interactions by learners
- Complexity of graphics
- Use of audio and video
- Number of frames per module
- Special features (e.g., exploratory branching)

Additionally, these factors affect each phase of the courseware development process (Analysis, Design, Development, Implementation, and Evaluation), which in turn affect the costs per interactivity level.

Development hours are directly proportional to the complexity of interactivity. Generally, the industry considers that for a Level I course, the number of development hours per one hour of seat time is in the range of two hundred (200) to three hundred (300) hours. This gradually increases such that Level IV is in the range of five hundred (500) to two thousand (2000) hours.

The table below represents the industry standards as documented by the American Society for Training and Development.

**Table 8. Cost Per Interactivity Level**

Level	Cost
Level I	\$10,000-\$20,000
Level II	\$25,000-\$35,000
Level III	\$40,000-\$50,000
Level IV	\$55,000-\$70,000

### 3.3.6 Learning Assessments

Learning assessments measure the competence or capability of learners when determining whether or not they have met the course objectives. This section discusses writing assessment questions, assessment strategies, and types of learning assessments.

#### 3.3.6.1 *Writing Assessment Questions*

Learning assessments should enable learners to demonstrate what they can do or what they know. When determining each assessment item, the instructional designer should ask the following questions:

- Is it relevant to the stated objectives?
- Is the wording/structure clear?
- Is each objective tested twice (during and at the end of the module)?

To accurately measure learners' mastery of the training content, a minimum of one assessment question per objective – more complex content requires that multiple questions should be asked. The level of objective measured determines the type of question asked. For example, use scenarios for analysis level objectives.

#### 3.3.6.2 *Assessment Strategy*

The ODP assessment strategy ensures that learners master the objectives, defined during Needs Assessment, for each course.

##### 3.3.6.2.1 *Pre- and Post-tests*

Pre- and Post-tests are valuable assessment tools used to measure learners' knowledge pertaining to a specific course.

1. **Pre-tests** - Pre-tests are used to measure learners' entry knowledge and provide them with a sense of what they will need to know upon completion of training. They also provide learners the opportunity to "test out" of specific modules within a course.
2. **Post-tests** - Post-tests are completed upon completion of an entire course and are used to measure whether learning actually occurred.

#### 3.3.6.2.2 *Number of Tries to Answer a Question Correctly*

There are several options available to instructional designers when determining the number of tries learners should be allotted to answer a given question correctly. The option chosen is often dependent upon the type of question/exercise (e.g., Practice or Module Assessment) presented. These options include, but are not limited to:

- Unlimited number of tries with immediate feedback
- Limited number of tries with immediate feedback
- Limited number of tries with remediation

#### 3.3.6.2.3 *Learner Mastery Level*

The recommended level of mastery for all ODP courses is a score of 75% on the post-test.

#### 3.3.6.3 *Types of Learning Assessments*

The following types of learning assessment interactions will be used in ODP courses:

- Practice Exercises (embedded questions)
- Module Assessments

##### 3.3.6.3.1 *Practices*

Practices are a type of interaction used to ensure learners comprehend the training content. Practice Exercises are presented within a topic (typically once every three to five screens) depending on the requirements of the related learning objective. There will be at least one practice question for each ELO.

Learners are presented with one opportunity to complete a Practice Exercise. After learners complete the Practice Exercise, they are provided with immediate feedback informing them of the accuracy of their response. For correct responses, learners will be told that their response is correct, and given the reason why. For incorrect responses, learners will be told that their response is incorrect and given the correct response and a reason why.

##### 3.3.6.3.2 *Module Assessments*

A Module Assessment will be provided at the end of each module. At least one assessment question will be provided for each ELO. In addition, assessment questions will be used to test learners at the TLO level. Assessment questions may use any of the four standard question types described in the next section.

There are two methods to structure a Module Assessment. The first will require learners to complete all questions for the module in a specific order. Learners will have one attempt to complete a question and will receive immediate feedback informing them of the accuracy of their response. For correct responses, learners will be told that their response is correct, and given the reason why. For incorrect responses, learners will be told that their response is incorrect and given the correct response and a reason why.

The second method to structure a Module Assessment is to incorporate remediation into the assessment sequence. In this structure, learners complete all assessment questions in a specific order and are notified of the accuracy of their responses on a Module Summary screen. The summary screen will contain the number of correct and incorrect answers. For every incorrect response listed, learners will be prompted to select each to receive remediation for the corresponding missed question. After they complete remediation, learners will be presented with the original question they missed and given the opportunity to answer it again. After they have responded to the question, they are returned to the Module Summary screen. Learners will continue with this process until they have responded correctly to at least 75% of the questions.

#### *3.3.6.3.3 Guidelines for Standard Types of Practice Exercises/Module Assessments*

This section provides guidelines for Practice Exercises/Module Assessment questions. The following types of questions are recommended for use in Practice Exercises and Assessment questions:

1. Multiple choice
2. Multiple-multiple choice
3. Matching
4. Case Study

#### *3.3.6.3.4 Multiple Choice Questions*

Multiple choice items are used for the recall of facts and the application of rules and procedures. Use multiple choice items to check discriminations and problem solving. A multiple choice item consists of:

- One stem
- One correct response
- Three distracters (incorrect responses)

Use the following guidelines for multiple choice items:

- For each item, develop one correct answer and at least three realistic distracters (a, b, c, d).
- Make the language of the correct answer and the distracters brief, similar in grammatical structure and word length, and worded in positive language.
- Avoid using negatives in any part of the multiple choice item (e.g., no, nor, not, none).

- Vary the correct answer position to avoid establishing an answer position pattern (e.g., “c” is generally correct).
- Do not use inclusive or exclusive answers or distracters (e.g., “All of the above”, “None of the above”, “Both a and b”.)
- If responses are numerical, list them in ascending order.
- Capitalize the first word at the beginning of each answer and distracter when the stem is a question.
- Do not repeat initial words in the responses. Load repetitive initial words into the stem (e.g., if “the” is the first word in each response, move it to the stem).

#### 3.3.6.3.5 *Multiple-Multiple Choice Questions*

Use multiple-multiple choice items when more than one correct response is possible. A broad scope of information can be covered within a single item of this type. This type of item has greater complexity and difficulty than simple multiple choice items. Use the following standards to develop multiple-multiple choice items:

- Group all items of this type together on a Practice Exercise/Module Assessment, so directions can be given only once for several items.
- Provide clear direction for choosing the correct answer(s).
- Use singular/plural verbs in the stem to prevent grammatical cues for the correct response.
- Use four or five responses.

#### 3.3.6.3.6 *Matching*

Use matching items to measure a learner’s ability to recall facts and label parts in pictures, schematics, diagrams, or drawings and for matching terms with their correct definition. Drop-down lists provide a solution for incorporating matching items while adhering to Section 508 Accessibility Requirements.

Use the following guidelines for labeling assessment items:

- Make all graphics and relevant components clear and sized appropriately to accommodate the available screen space.
- Provide sufficient information to indicate what the graphic item is and which part is to be labeled.
- Specify clearly the parts to be labeled or identified.
- Provide one definitive answer.

#### 3.3.6.3.7 *Case Studies*

Use case studies to present real-life scenarios with follow-up question(s) pertaining to the scenario. The follow-up questions can be multiple choice or multiple-multiple choice. This presentation/question format allows learners to use their skills by analyzing a situation and applying knowledge that they have previously gained in the module.

Use the following guidelines for case study items:

- Present a real-life scenario that is applicable to the information previously presented and now being tested. Avoid uncommon or unrealistic scenarios, as they will present a distraction to the learners.
- Ensure all follow-up questions relate to the case study presented and are in accordance with all previously defined question standards.

## **3.4 Development Strategies and Best Practices**

### **3.4.1 Overview**

This section will present strategies and best practices that support the Web-based course development process. Specifically, this section will discuss course User Interface Design Specifications, General Screen Development, Media Types, Digital Audio, Digital Video, Programming, and Accessibility Compliance (Section 508).

### **3.4.2 Course User Interface Design Specifications**

This section describes the recommendations for screen design, interface specifications, and course control elements, indicators, content layout, and content graphics.

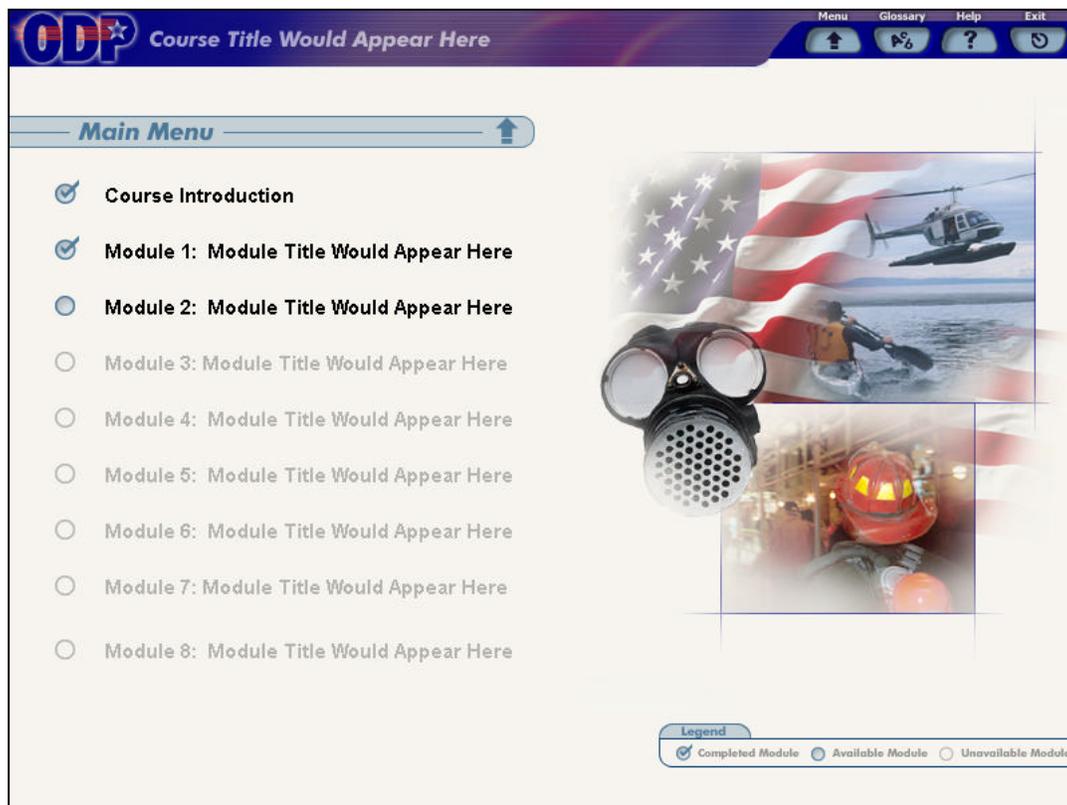
#### *3.4.2.1 Screen Design*

The following interface templates illustrate the best practices and recommendations for screen design.

##### *3.4.2.1.1 Course Main Menu*

A course Main Menu is essentially a list of all the sections of a course. The Main Menu can always be returned to from inside the course and is a starting point from which the learner navigates through the course. Visual cues may be used to track progress through the course. The following sample provides a visual representation of the learner's progress. The main menu screen contains a legend to explain the visual cues.

Figure 9. Course Main Menu - SAMPLE



### 3.4.2.1.2 Topic Menu

From the Main Menu, learners can select a module. Learners are then presented with a Module Introduction screen from which they can select a topic. The following two figures provide examples of a closed (Figure 10, below) and an open topic drop-down menu (Figure 11, below).

Figure 10. Topic Menu (Closed) - SAMPLE

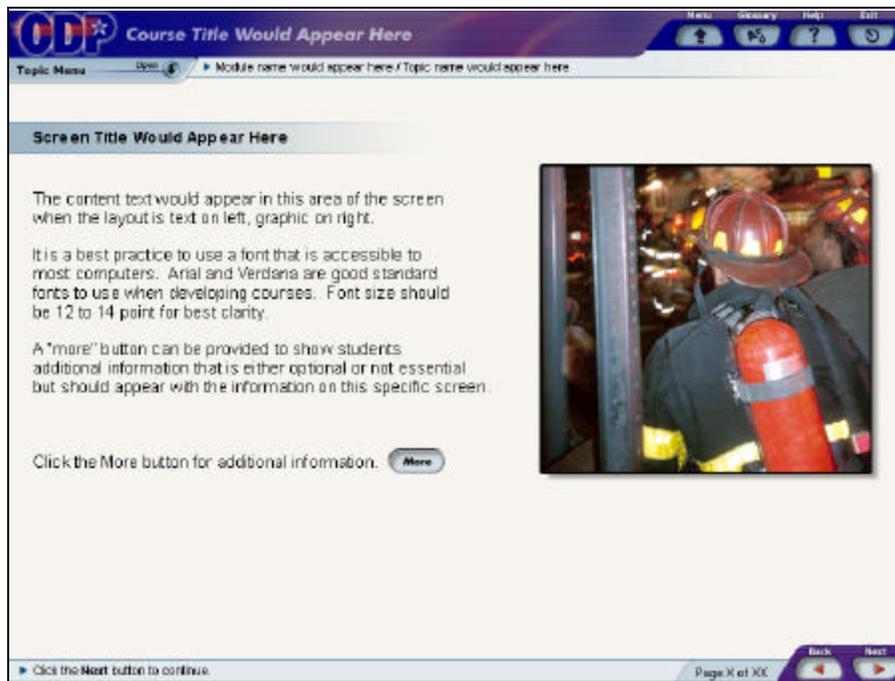
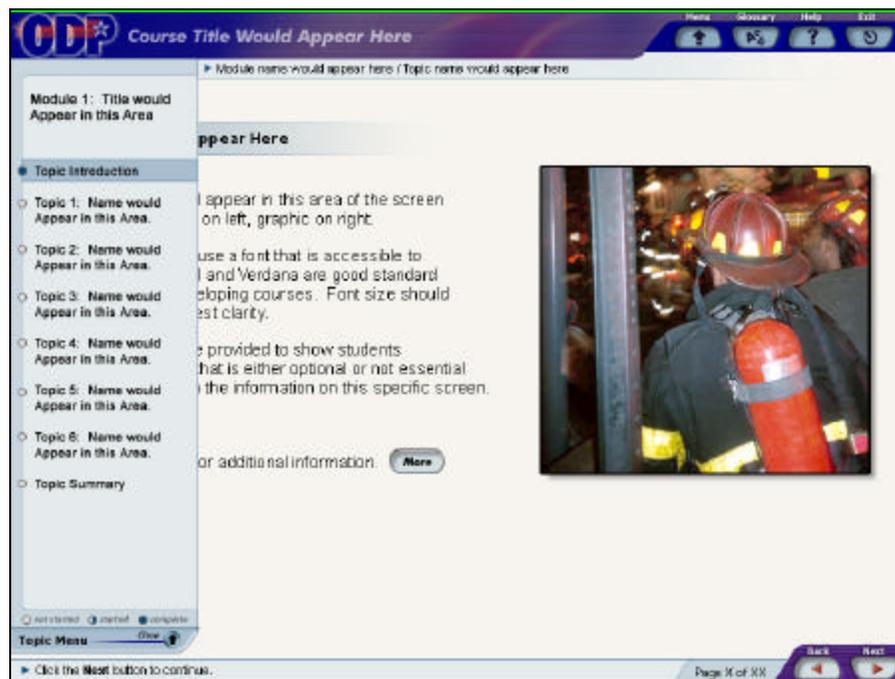


Figure 11. Topic Menu (Open) - SAMPLE



### 3.4.2.2 Interface Specifications

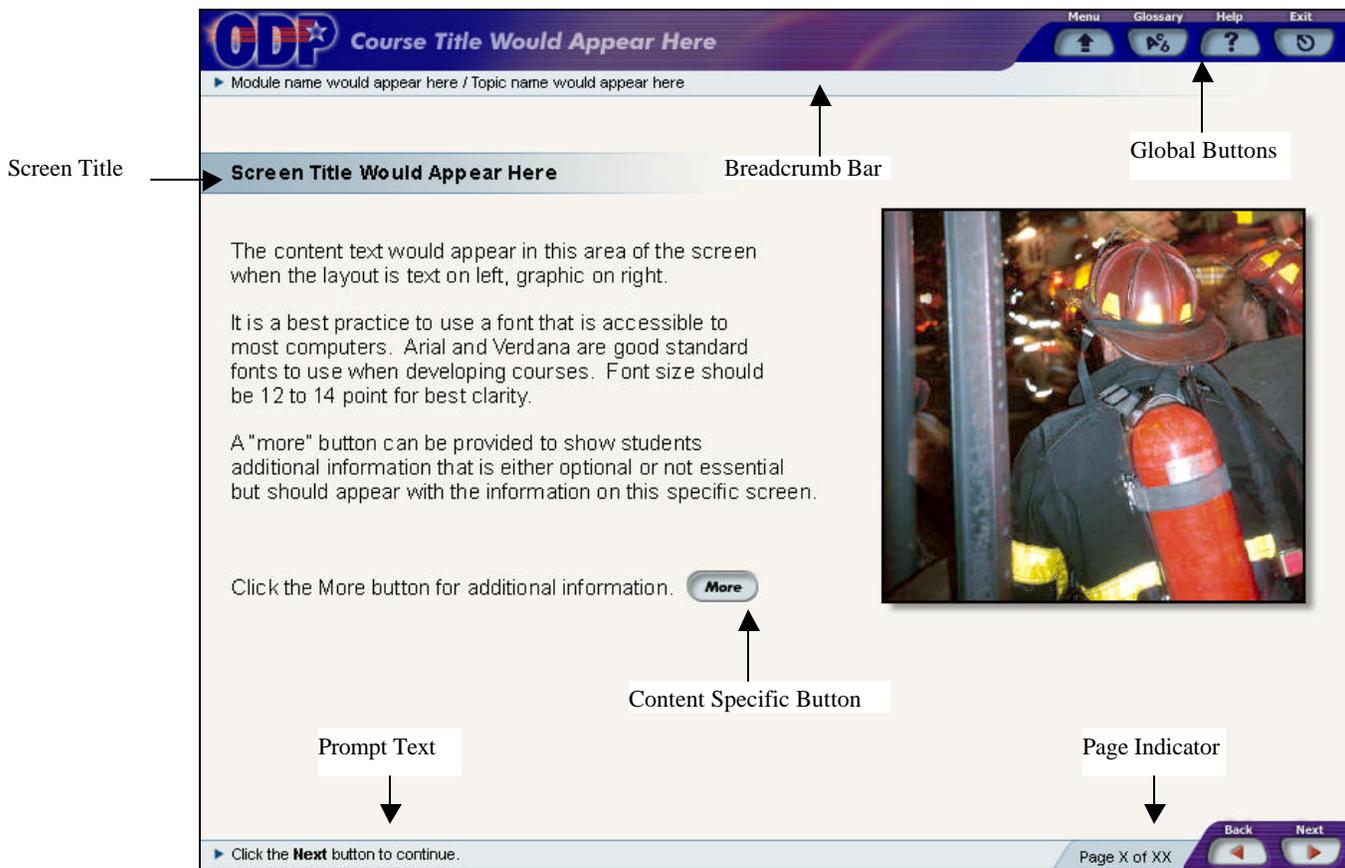
Table 9 (below) identifies the characteristics of the HTML and graphical elements of the interface (See Figure 12, page 73, for a diagram describing the location of the interface elements). All finished graphics should be saved as 16-bit compressed .jpg /.gif files. Table 9 also contains recommendations and best practices for interface elements.

**Table 9. Interface Specifications**

Interface Item	Description
<b>Global Interface</b>	All screens will use a standard background and top bar banner layout, logo and course title. The global interface will display as: <ul style="list-style-type: none"> <li>• Page background color: bin hex code</li> </ul>
<b>Global Buttons</b>	These buttons will be placed in the top right portion of the course window layout. The global buttons will display as three possible states, Normal, Selected (highlight) or disabled (grayed out). Global buttons will be displayed as: <ul style="list-style-type: none"> <li>• .jpg/.gif graphics</li> <li>• Button names may be overlaid as part of the graphic</li> </ul>
<b>Breadcrumb title</b>	The breadcrumb bar should display the specific learners' location within the course.  Breadcrumb bar displays as: <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana font</li> <li>• Left-justified</li> </ul>
<b>Screen Title</b>	The title bar contains the screen title. The screen title is displayed as: <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana</li> <li>• Left-justified</li> </ul>
<b>Content Body Text</b>	The body text consists of the main text area content for any given screen. This text displays as: <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana 12-14 pt. usually black font</li> <li>• Left-justified</li> </ul>
<b>Content Hyperlinks</b>	Hyperlinks should be used to link to pop-up content within the course, and should include indications of the following states: <ul style="list-style-type: none"> <li>• Normal</li> <li>• Visited</li> <li>• Rollover</li> </ul>
<b>Content Bullets</b>	Bullets are used to separate, organize and chunk information. Bullet text is displayed as: <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana</li> </ul> Bullet Shape can be customized according to course needs.
<b>Page Indicator (i.e., page X of X)</b>	The page indicator is displayed as: <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana</li> <li>• Left-justified</li> </ul>

Interface Item	Description
<b>Course Content Navigation Buttons</b>	<p>These button controls “Back” and “Next” will have three states:</p> <ul style="list-style-type: none"> <li>• Normal</li> <li>• Selected</li> <li>• Disabled</li> </ul> <p>The buttons will display as:</p> <ul style="list-style-type: none"> <li>• .jpg /.gif graphics</li> <li>• Futura Md Bold 8 pt. font overlaid as part of the graphic</li> </ul>
<b>Prompt Text</b>	<p>Prompt text is instructional text informing learners of how to proceed. Prompt text displays as:</p> <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Arial or Verdana font (bold font when referring to a button),</li> <li>• Left-justified</li> </ul>
<b>Content Specific Buttons</b>	<p>Content-specific buttons can have three to four states: Normal, Highlighted, Selected/Down, and Disabled.</p> <p>Content-specific buttons may include any or all of the following:</p> <ul style="list-style-type: none"> <li>• More</li> <li>• Scenarios</li> <li>• Questions</li> <li>• Print (Certification)</li> </ul>
<b>Text window pop-ups</b>	<p>The storyboard design may include references to linked text within the course content area that will display in a window specific to that word or phrase, this is referred to as a “pop-up”.</p> <p>The pop-up link will display as:</p> <ul style="list-style-type: none"> <li>• Underlined HTML text (hyperlink)</li> </ul> <p>The pop-up text box will display as:</p> <ul style="list-style-type: none"> <li>• HTML text</li> <li>• Window will be sized appropriate to amount of text content and will be color coordinated to match the course look and feel</li> </ul>
<b>System alert boxes</b>	<p>System alert boxes will follow the standard MS Windows layout including a close window “X” control. An example of this window would be if the user selects a module from the main menu that they have not been through and is out of sequential order. This box may be color coordinated to be similar to pop-up windows.</p>

Figure 12. Interface Elements



3.4.2.3 Course Control Elements

Learners will navigate through the course content using the next and back buttons. When learners reach the end of a topic in a module, they will be returned to the main menu. Learners will then need to select the next module (whether sequential or learner determined will depend on course) from the main menu to continue.

Suggested global (always available within the course) navigational buttons are described below:

1. **Menu button** - The Menu button returns learners to the main menu screen and will include a disabled state.
2. **Exit button** - The Exit button displays an alert box asking learners if they are sure they want to exit. If yes is clicked the course is closed.
3. **Back button** - The Back button returns learners to the previous content screen (disabled on the first screen of content).
4. **Next button** - The Next button forwards the learners to the next screen of course content.
5. **Glossary button** - The Glossary button opens a new window containing an alphabetical list of glossary terms.

6. **Help button** - The Help button opens a new window containing help content.

#### 3.4.2.4 *Course Indicators*

Course indicators are those screen elements that are part of the interface providing learners with prompts and their location within the course.

The control elements listed below can be programmed into the course:

1. **Prompt text** - Prompt text displays user instructions (e.g. "Click the Next button to continue").
2. **Page indicator** - The page indicator displays current page number and total number of pages in the specific lesson (e.g., Page 2 of 23).
3. **Progress indicator** - The progress indicator displays graphical element of current module progress.
4. **Breadcrumb bar** - The breadcrumb bar displays module and topic progress.

#### 3.4.2.5 *Course Content Layout*

The course content area is defined as content contained within the global interface.

The following are examples of template layouts that can be used to display course content:

1. **Text only** - The text only content area will contain only text, e.g., practice question
2. **Text on left, graphic on right** - For text on left, graphic on right, text and graphics will be placed in HTML table cells side by side.
3. **Text on bottom, graphic on top** - For text on bottom, graphic on top, text and graphics will be placed in HTML table cells on top of each other.

#### 3.4.2.6 *Course Content Graphics*

The course will be composed of both graphics and text that will be specifically called out in the course storyboard. Graphic specifications should include:

- Source art for screen graphics should originate from royalty-free sources or client supplied graphics /photographic images.
- Screen graphics should adhere to one of the course content templates described above but may contain either one or a collage of images dependent upon source artwork and how to best support the storyboard content.
- Screen graphic artwork should have a consistent look and feel to help the image standout in the screen layout. An example would be a black border (2pt) with a 30% black drop shadow.

### 3.4.3 General Screen Development Standards

General screen development standards provide recommendations for developers to follow when creating screens. This section discusses Text Layout, Text Appearance, Visual Elements, and Media Types.

#### 3.4.3.1 *Text Layout*

The following list contains the recommended standards for text presentation:

- Limit the amount of text on screen.
- Use short lines of 40-60 characters.
- Avoid long segments of text wherever possible. Convert full text documents or long text segments requiring more space than is available on a single screen to PDF format.
- Use short sentences and paragraphs. Use bullets, numbered lists, tables, and charts to break up lengthy sentences.
- Provide generous white space to separate blocks of text.

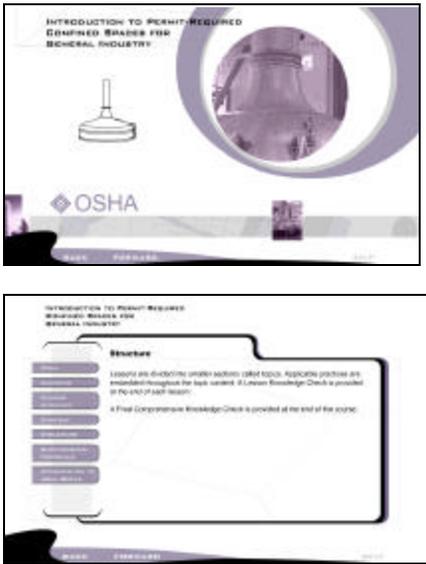
#### 3.4.3.2 *Text Appearance*

The following list contains the recommended standards for text appearance:

- Do not indent paragraphs.
- Use left justification for basic text.
- Reserve upper case words for certain titles, and even then, use sparingly.
- Do not use underlining except for hyperlinks. Glossary words and important terms and phrases are hyperlinked, providing learners with access to additional information. To emphasize a word or concept, use bold, avoid using italics, all-capitals, or underlines.
- Hyperlinks will have three colors specified by graphic designers to indicate the hyperlinks states; normal state (link has not been accessed), rollover state (link is currently being accessed) and visited state (link has already been accessed).
- Do not use blinking text.

3.4.3.3 Media Types

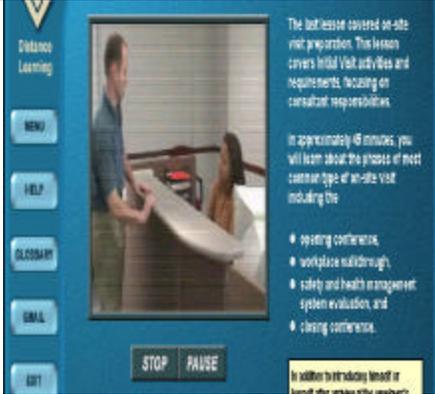
Table 10. Media Types

Media					
Type	File Format	Example	Description	Strategy	Level of Difficulty
Splash Screen Sequence	.swf		<p>This media element is an opening animation that introduces the learner to the course and gives the learner an overall feel of what they will be learning. A best practice is to include elements, such as photos, illustrations, 2D/3D graphics or any other visual element that can tell a story about the course in the opening animation or splash screen sequence. Usually, the animation has embedded controls such as; back, forward and skip so the learner can bypass the animation at any time and go directly to the Main Menu. Other optional information that can be included in a splash screen sequence includes: credits, history or background to the course.</p>	<p>This type of screen/media element is an excellent tool for engaging/motivating learners and giving them an overview of what they are going to learn in the course.</p>	3-4

Media					
Type	File Format	Example	Description	Strategy	Level of Difficulty
Complex Animation	.mov .avi .mpg .swf .wmv		<p>A complex animation is used to enhance a learner's experience by providing a visual to a scenario that is often difficult, impossible or cost prohibitive to photograph or videotape. Complex animations may be created in a 3D or 2D software package and can include special effects such as particle-driven fire, smoke or water, audio, animated characters, or highly-detailed environments.</p> <p>Complex animations are the most time-consuming media element to create and modify therefore detailed information and references are required from a SME. Use complex animations when the following conditions exist:</p> <ol style="list-style-type: none"> <li>1) A situation can not easily be portrayed through other media elements.</li> <li>2) Reuse of the animation or part of the animation on another screen icons or elements of complex 3-D animations when possible.</li> </ol>	<p>Complex animations provide a great way to re-create a scenario or environment that is difficult, impossible or cost prohibitive to photograph or videotape.</p> <p>Some examples are:</p> <ul style="list-style-type: none"> <li>• Dangerous work environments, where a 3D character can be put in potential harm.</li> <li>• To show scenes with explosions, fire, water or smoke damage</li> <li>• To show how a piece of machinery works or is damaged if used improperly.</li> </ul>	3-4

Media					
Type	File Format	Example	Description	Strategy	Level of Difficulty
Simple Animation	.mov .avi .mpg .swf .wmv	<p><b>Air Flow Characteristics of Supply &amp; Exhaust</b></p> <p>Supply Opening Approximately 10% of face velocity at 33 diameter distance from supply opening</p> <p>Exhaust Opening Approximately 10% of face velocity at one diameter distance from exhaust opening</p> <p>( 500 FPM air velocity at face of both openings )</p>	<p>A simple animation can be created in a 2-D or 3-D software package and usually shows a simple process by animating simple elements such as shapes, text, photos or simple illustrations. These types of graphics are less time-consuming than complex animation and are sometimes used when less reference items are available.</p>	<p>Simple animations are a great way to get the learner to interact with a concept.</p> <p>Some examples of simple animations include:</p> <ul style="list-style-type: none"> <li>• A moving photo collage or montage</li> <li>• Animated arrows in diagram or schematic to show flow or a process.</li> </ul>	1-3
2D/3D Illustration	.jpg .gif	<p>Pellet Mill</p>	<p>2D and 3D illustrations are static graphics that are used to enhance and supplement reference materials that are provided by the SME. Illustrations help learners visualize a concept and further enforce instructional text.</p>	<p>Illustrations are helpful for providing:</p> <ul style="list-style-type: none"> <li>• A unique perspective on an environment or object</li> <li>• Detail unavailable in existing photos or graphics</li> <li>• A recreation of a photo or illustration that is copyrighted</li> </ul>	1-3

Media																	
Type	File Format	Example	Description	Strategy	Level of Difficulty												
Static Graphics	.jpg .gif	 <table border="1"> <caption>Levels of Carbon Monoxide (CO)</caption> <tr> <td>10,000 ppm</td> <td>Immediate unconsciousness, death in one minute</td> </tr> <tr> <td>6400 ppm</td> <td>Death in 10 to 15 minutes</td> </tr> <tr> <td>1600 ppm</td> <td>Headache, dizziness, nausea in 20 minutes, death in 1.5 to 2 hours</td> </tr> <tr> <td>1500 ppm</td> <td>IDLH (from NIOSH Pocket Guide, June 1990)</td> </tr> <tr> <td>500 ppm</td> <td>Death in four hours</td> </tr> <tr> <td>200 ppm</td> <td>Slight headache</td> </tr> </table>	10,000 ppm	Immediate unconsciousness, death in one minute	6400 ppm	Death in 10 to 15 minutes	1600 ppm	Headache, dizziness, nausea in 20 minutes, death in 1.5 to 2 hours	1500 ppm	IDLH (from NIOSH Pocket Guide, June 1990)	500 ppm	Death in four hours	200 ppm	Slight headache	<p>Static graphics usually include items that are provided by the client/SME for reference material. These items can include; photographs, clipart, charts and tables. They may also include photographic material royalty-free. Some diagrams and charts may need to be recreated if the reference material is not usable or does not fit in with the look and feel of the course.</p>	<p>These types of graphics are useful to include because they provide real-life examples and context for learning content.</p> <p>Some examples are:</p> <ul style="list-style-type: none"> <li>• Photos</li> <li>• Clip-art</li> <li>• Tables of information</li> <li>• Documents</li> <li>• Diagrams</li> </ul>	1-2
10,000 ppm	Immediate unconsciousness, death in one minute																
6400 ppm	Death in 10 to 15 minutes																
1600 ppm	Headache, dizziness, nausea in 20 minutes, death in 1.5 to 2 hours																
1500 ppm	IDLH (from NIOSH Pocket Guide, June 1990)																
500 ppm	Death in four hours																
200 ppm	Slight headache																

Media					
Type	File Format	Example	Description	Strategy	Level of Difficulty
Digital Video	.mov .avi .mpg .wmv	 <p>The last lesson covered on-site visit preparation. This lesson covers initial visit activities and requirements, focusing on consultant responsibilities.</p> <p>In approximately 45 minutes, you will learn about the phases of most common types of on-site visit including the:</p> <ul style="list-style-type: none"> <li>• opening conference,</li> <li>• workplace walkthrough,</li> <li>• safety and health management system evaluation, and</li> <li>• closing conference.</li> </ul> <p>In addition to introducing himself or herself to other members of the organization...</p>	<p>Digital Video can be time-consuming and more costly to produce if there is not “near broadcast quality source material” that has been previously shot and that aligns exactly with the storyboard content.</p> <p>When using existing video, written copyright permission is required unless the video is obtained from one of the following sources:</p> <ul style="list-style-type: none"> <li>• royalty-free websites</li> <li>• client-owned material</li> <li>• government-furnished material</li> </ul>	<p>Digital Video is best used to:</p> <ul style="list-style-type: none"> <li>• Provide a “true-to-life” example of a work environment</li> <li>• Illustrate how to perform a task</li> <li>• demonstrate how a piece of machinery works</li> </ul>	4

### 3.4.4 Graphics Development

This section discusses the qualitative and technical considerations appropriate for graphic development.

#### 3.4.4.1 *Qualitative Considerations*

The following list of recommended guidelines should be used when developing graphics and photos:

- Avoid using too many visual cues or too many colors at once.
- Ensure adequate contrast between text and background colors.
- Ensure that key details are easily identified.
- Photos should be digitized and saved in a JPG format.
- Ensure consistent look for photos and graphics by establishing standards such as backgrounds, borders, size of borders, etc.
- Clipart, simple line art, logos, icons, and tables should be saved in a .gif format.

#### 3.4.4.2 *Technical Considerations*

The following list of recommended guidelines should be used when producing graphics for WBT:

- Use 72 dots per inch of detail for all images.
- Develop graphics for 16-bit SVGA color environment. Graphics should be saved as 256 color images to save space and ease download time.
- Optimize graphics for viewing within an online browser environment. Use file formats most appropriate for that purpose (e.g., .gif and .jpg).
- Design graphics so that images appear on the screen before the text or captions when they are not supposed to appear simultaneously with text items.
- Place large or complex graphics on the screen in logical sections. Each section should finish drawing before the next section begins. Large graphics will be saved in a progressive download format (e.g., .gif and .jpg) or sliced to facilitate faster downloading.

#### 3.4.4.3 *Charts and Illustrations*

Charts (e.g., pie charts, bar graphs etc) can be used very effectively to present information in an online format for instructional and presentational purposes. The following list of recommended guidelines should be used when producing charts and illustrations:

- Use a standard look and feel for all charts in a course to give them consistency.
- Title charts clearly with appropriate weight fonts and size.

- Do not overload the chart with too many small symbols or graphics that would not interpret well with an online graphic.
- Use chart animation sparingly; learners should focus on one element only and animations should be no longer than 5 seconds.

### 3.4.5 Animation

This section discusses the qualitative and technical considerations appropriate for animation development.

#### 3.4.5.1 *Qualitative Considerations*

The following list of recommended standards should be used when developing simple and complex animations for WBT:

- Avoid using blinking screen elements (e.g., text or graphics).
- Avoid animation that moves across the screen or otherwise distracts learners from the content.
- Use special effects only when required for emphasis or transition. Do not use any special effect that takes attention away from learning.
- Consider your audience. Think carefully before using cartoon-like animations.
- Engage learner interaction with the animations by allowing them to click on an item/graphic element, button or text to play an animation or video clip.
- Animation paths, colors, and object distinctions should remain clear and uncluttered.
- Use complex 2D/3D animation:
  - To show key concepts that are difficult to describe, impossible or cost-prohibitive to photograph or videotape
  - Use complex animation when the animation or parts of the animation will be reused elsewhere in the course

#### 3.4.5.2 *Technical Considerations*

The following list of recommended guidelines should be used when producing animations for WBT:

- 2-D animations should be created in the Flash/Shockwave format (.swf) at the appropriate resolution.
- 3-D animations should be created at a resolution of 320x240 and should be created as either digital video files or Flash/Shockwave (.swf) files.
- “Hybrid” animations that can include 3-D imagery and/or more complex 2-D animations should be created in the Flash/Shockwave format (.swf).
- The Flash 6.0/MX player allows for viewing of video within a Flash .swf file. Video within Flash must either be a linked QuickTime file or embedded Sorenson-encoded digital video file.

### 3.4.6 Digital Audio

This section discusses the pre- and post-production recommendations for digital audio development.

#### 3.4.6.1 *Pre-production*

Original audio is expensive to produce, and once outdated, requires further expense to update. Use audio judiciously. The following list of recommended standards should be used to select audio:

- Design audio into lessons where it is critical to the mastery of the learning objectives.
- Do not use narration.

The following list of recommended standards should be used to develop audio:

- Create a separate script to correspond to each changing element within the screen. For example, if the audio is to be synced with the appearance of three bullets, then create three separate audio scripts. Label the scripts and the event to explain the relationship.
- Before recording any audio, make sure all scripts are ready and signed off.
- Remember that legal issues will only arise based on the content in your digital audio files. If you don't have the copyright to distribute a sound byte or song, but do so anyway, that's when it becomes illegal. When obtaining rights to use any audio, make sure you verify your ability to use it in a multimedia environment (Web, CD-ROM).
- Avoid long pauses in visuals waiting for extended narration to finish.
- Make clear the transition from one concept to another.
- State in the storyboard the actual words to be recorded. If additional space is necessary, add a page.
- Keep language simple, active, and direct. Use short sentences. Avoid acronyms, technical jargon, and unfamiliar terms. Define terms if used.
- Express all numbers numerically.
- Format the acronym to reflect each letter if it is to be read, (e.g., R-M-P).

#### 3.4.6.2 *Post-production*

The following list of recommended guidelines should be used for audio post-production:

- Use a professional narrator for all narration. Ensure that narrator uses appropriate style and tone.
- Create a text transcript of audio in accordance with current accessibility standards so they are available for use in closed captioning and as a separate document download.

- Digitize at 44.1kHz sample rate, 16 bit sample size (a.k.a. sample resolution).
- When down sampling for use in a Web or CD-ROM environment, follow these general standards: for music, leave it at that 44.1 kHz rate, for speech in a foreign language, down sample to 22.05, for native language, down sample to 11.025.
- Save source files as .WAV files and back them up onto a CD-ROM as regular data files and not encoded audio files (do not make a music CD from them).
- When performing audio compression, consider .MP3 (MPEG-1 Audio layer III) as an option- While you can choose many different bit rates for MP3, a common practice is to use 128 kilobits per second for music recorded in stereo, and 64 kilobits per second for music in mono. MP3 allows a 32MB .WAV file to be compressed down to about 3MB, increasing the feasibility to download it via the Internet. The latest in audio compression standards, such as MPEG-4, should also be weighed against end user requirements.
- Various file types can “embed” audio within them. These include Flash, Shockwave, and various video file formats. In all of these formats, the best and latest built-in audio compression option(s) should be considered when building content. For flash and shockwave this could mean MP3 compression, while for many current video codecs this would mean the MPEG4-based audio compression already built into many of them.

### 3.4.7 Digital Video

This section discusses the pre- and post-production recommendations for digital video development.

#### 3.4.7.1 *Pre-production*

Video should be used very judiciously. The following recommended standards should be applied when selecting and using video in WBT:

- Video should be used to reinforce, clarify, or emphasize a specific behavior or learning objective that cannot be effectively taught using graphics, stills, photographs, or animations.
- There are various costs involved in producing a video. Making sure that segments of edited video tell a story and are thought out in advance of the editing process can be time consuming and expensive. Video editors need a strong producer/director to give them direction on what needs to be done.
- Before embarking on a video production, make sure all scripts are ready and signed off.
- Professional actors should be employed when possible for video productions.
- Continuous video clips (more than 15 – 20 seconds in length) should not be used.

- Appropriate video format for the content should be presented (e.g. talking head, show and tell, interview, panel discussion, simulation, or dramatization).
- Remember that legal issues can arise from the content in digital video files. If you don't have the copyright to distribute a captured video image, but do so anyway, that's when it becomes illegal. When obtaining rights to use any video footage, make sure you verify your ability to use it in a multimedia environment (Web, CD-ROM).
- If the content requires motion to clearly depict the point then video should be used.
- The main subject should be well lit and background distractions eliminated.
- Always take several "takes" of the same scene or subject with enough "padding" in the beginning and end of your shots. Examples include wide shots, close-ups, panning shots, zooming in, zooming out, and action shots.
- Separate page should be used for video scripts and reference the corresponding screen number in a two-column format. The left column should describe the scene to be produced and the right column should state the actual words to be recorded.
- Traditional techniques such as zooming, panning, transitional wipes and dissolves and fast motion subjects should be avoided because of reduced performance it causes in compressed digital video.
- Uncompressed AVI or MPEG-2 format should be used for saving video sources. These files should be saved to either CD-ROM or DVD for archival purposes.
- Text transcripts should be created and provided.

#### 3.4.7.2 *Post-production*

The following recommended guidelines should be used for video post-production:

- Use video or graphic window overlays to show extreme close-ups of small objects such as knobs and switches for wide-angle views.
- Record original video in a high-quality format such as Beta or DV. The greater the quality of the original video footage, the greater the quality of the compressed digital video the end user will see.
- Video player must allow learners to play, pause, and repeat video.
- Video must be delivered in a file format fitting within the technical specifications of the end user audience. A centralized network technology department will be able to help with finding out what digital video format is best to use (i.e. Windows Media, Real Networks, QuickTime, Flash MX/6.0 Sorenson, etc.).
- The Flash 6.0/MX player allows for embedded digital video encoded with the Sorenson codec.

- Digital video files should be viewable within the targeted browser currently being employed by the majority of end users. The ability to download needed plug-ins, programs, and APIs should be built into the course/presentation if they are not already available within the targeted browsers.
- Video should be created at a resolution of 320x240. Other resolutions can be used (i.e. 240x188 and 176x144), but any resolution chosen should become a general standard throughout your course or presentation.
- Encode video files using a standard that offers widespread support, while providing maximum compression (i.e. Microsoft Windows Media MPEG-4 Video v. 3 video codec, Windows Media Audio v. 7 audio codec, RealPlayer 8.0, etc.).
- Deliver the uncompressed source video in its edited form as it was used in the course (e.g., if a 30-second clip was used from a 20-minute program, then provide the 30-second clip as well as the entire program.) Label the uncompressed source video to correspond to its respective compressed file.
- Consider your audience when creating digital streaming video. If it is possible, create a multi-bit rate encoded video, which allows end users at different connection speeds to view the same file. This type of file actually senses at what speed an end user is connected. If the user is connected via a dialup connection, the file will deliver a highly compressed video signal for dialup. If the user is connected via a cable or DSL modem, the file will deliver a better quality video signal. The most common bit rates are outlined in Table 11 (below).

**Table 11. Common Encoding Bit Rates**

Encoded Bit Rate	Target Audience
28.8Kbps	Dialup Users @ 28.8
56Kbps	Dialup Users @ 56K
80Kbps	ISDN & slow corporate networks
150Kbps	Fast corporate networks
256Kbps	DSL, cable modem, satellite dish, and very fast corporate networks

### 3.4.8 Streaming Media

This section discusses the recommendations for streaming media development.

#### 3.4.8.1 Streaming Media Recommendations

The following recommendations should be considered when deploying streaming media content across a network.

- “Streaming media” refers to both audio and video content being “broadcasted” over the Internet through the delivery of network packets between hosting servers and end users.

- Streaming media can be transported via UDP (User Datagram Protocol), TCP (Transmission Control Protocol), IP Multicast, and HTTP (HyperText Transfer Protocol)
- When considering the content delivery network (CDN) infrastructure upon which streaming media is to be delivered, it is important to note that a local area network (LAN) or wide area network (WAN) firewall may be set up to deny entry to streaming media.
- Streaming media can be received by the end user in one of three ways: as a progressive download, as a progressively streamed download, and as a real-time stream. A progressive download means that the user will not be able to view the video until it has downloaded in its entirety. A progressively streamed download means that content in the video will be shown as it becomes available during the download (there is no “true” buffering). A real-time stream will “buffer” by downloading a small amount of the video to memory (the “buffer”) and then immediately replacing it with the next small amount of video (one piece plays while the next piece downloads).
- In high Internet visibility scenarios, streaming media should ideally be stored on a server that is specifically for such purposes. Streaming servers allow for UDP broadcast, multicast, and video-on-demand capabilities, while ordinary HTTP servers do not. A “streaming media” file hosted on a true streaming media server can be accessed by the end user as a real-time stream. On the other hand, under moderate circumstances, storing a “streaming media” file on an HTTP server will result in progressive downloads of the “streaming media” file.
- With streaming media it is important to consider your CDN (Content Delivery Network) and whether it is prepared for Multicasting.
- Multicasting is a one-to-many form of transmission that sends data to a group of users. Multicasting saves network bandwidth because the files are transmitted as a single data stream until the last hop, where individual streams are sent to the end user or target stations by the router at the end of the path. Multicasting does not require the amount of network bandwidth as unicasting since the file is only sent once over the network. Unfortunately, Multicasting requires that the CDN contain special routers and network hardware.
- Unicast connects point to point. This means that the streaming server hosting unicasted files will need to open a new connection for every user that wishes to view its content. This requires an open network connection for every user and can be quite expensive in terms of network usage.
- Video at 320x240 is a standard frame size, although smaller sizes such as 240x188 and 176x144 can be used if a significant audience viewing the video via dialup is anticipated.

- Streaming media is often “linked” to what are commonly known as “Meta Files.” These are relative “pointer” files that contain the actual absolute path to the video/audio content. Linking to “pointer” files such as these eliminates the need of updating a large portion of absolute links throughout a website by storing the one absolute link in just one file that can easily be updated. Examples file extensions include: .RAM, .SMIL, .SAMI, .ASX, and .QTL. Additionally, these files can be used to create “playlists” that can contain instructions to stream several pieces of content back-to-back, eliminating the need for the user to click on multiple links to view multiple pieces of content.

### 3.4.9 Programming

This section discusses the recommended programming standards, scripting and authoring tools, product testing, and configuration management.

#### 3.4.9.1 Standards

The following recommended standards should be used during programming:

- Comment code when appropriate and possible.
- Have designers create file names for media during the storyboarding phase. Media files must use the names specified on storyboards. If, during the production of media elements, files must be added, combined, or otherwise renamed, the storyboards must reflect these changes.
- When possible, put common code fragments in include type files for re-use throughout the course.
- Use frames if and when necessary to break up screen content (i.e. interface areas, menu's, content frames).

#### 3.4.9.2 Scripting and Authoring Tools

ODP WBT could be created using native Web scripting technologies. They include: HTML, JavaScript, XML, DHTML, and Cascading Style Sheets (CSS). Programming should follow both industry standards and best practices. In addition to native Web scripting technologies, authoring tools such as Macromedia Authorware and Flash (both which use Macromedia Shockwave technology) may be used.<sup>7</sup>

#### 3.4.9.3 Product Testing

The following two phases are recommended for the system testing and validation process:

- **Phase I: Final Systems Testing**  
During Phase I, ODP content developers should validate the lessons and prepare reports indicating which changes, if any, will need made to ensure the instructional effectiveness of the WBT. Once the entire course has been validated by ODP project team and revised, it will undergo final field-testing.

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<sup>7</sup> See <http://www.macromedia.com> for information on Macromedia products.

- **Phase II: Field Testing**  
During Phase II, learners in the field will take the course and provide feedback. From this feedback, revisions will be made and courseware will be finalized.

### 3.4.10 Configuration Management

Standard configuration management practices should be established at the beginning of the production cycle. This includes: designing the directory structure, file naming conventions, backup practices, and migration methodologies.

- **Directory Structure:** Directories should be created and named in such a manner that the Course is organized in an easy to understand and maintain manner.
- **File Naming Conventions:** Files (html, graphics, script files) should be named in a way that designates the course structure.
- **Backup Practices:** Files should be backed up on a regular basis. Local backups should be done several times a day. Hard copy backups (tape, CD-ROM) should be done on a weekly basis.
- **Migration:** Courseware should be migrated to appropriate servers for development testing, reviews, and final hosting.

### 3.4.11 Accessibility Compliance (Section 508)

Most government organizations are now requesting that content will be developed and delivered in accordance with the 1998 amendments to the Rehabilitation Act (informally known as Section 508).<sup>8</sup> There are many tools available to help test compliance with the various aspects of these accessibility regulations:

- UsableNet [Lift](#) is 508 verification extension software for [Macromedia Dreamweaver](#).
- [Cast Bobby](#) is third-party Section 508 compliance checking software.
- [Jaws](#) is a screen reading product that allows Web pages to be read aloud.

The following is a high level checklist of some design considerations before developing content. This is only a partial list of talking points and should be used for discussion between developers, customers, and project managers.

- A text equivalent for every non-text element is provided. All interface images and navigation buttons have "Alt" description text tags.
- All navigation functions and interactive elements are keyboard accessible by tabbing to the desired button and pressing the Enter key. In addition, accelerator keys are assigned to all navigational elements that allow the user to quickly access the function without the use of a mouse/pointer device. (For example, "Alt-n, Enter" will display the next content page.)

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<sup>8</sup> See <http://www.access-board.gov> and <http://www.Section508.gov> for more information.

- All Image mapping and pop-up layering scripting are client-side, allowing for "reading" by assistive technologies for the blind.
- All interface graphical elements including navigation button images have passed tests with graphical tools designed to test for readability/visibility problems experienced by people with color-blindness.
- All frames used have names that indicate purpose and/or function. Specifically, the frames are named "Logo", "Content", and "Navigation."
- Java applets are not used.
- Flash and Windows Media elements are not used in the interface. However, if these elements were to be used in the content area, the Dreamweaver tool will provide links to download these plug-ins if they are not already installed on the user's browser.
- All text, interface elements, and content can be displayed without the use of a style sheet, if necessary.

### **3.5 Delivery Environment Strategies and Best Practices**

#### **3.5.1 Overview**

In addition to the instructional, design, and development guidelines outlined throughout this document, it is also important to consider how this content will be delivered, managed, and hopefully reused or repurposed. Some level of coordination is required to provide the First Responder Community with the flexibility it needs to share content and realize its investment in Blended Learning. This includes adopting industry-recognized standards for content packaging, using Learning Management and Learning Content Management Systems (LMS and LCMS) that incorporate industry-recognized standards for interoperability and accessibility, and applying a delivery approach suitable to First Responder end-users.

#### **3.5.2 Interoperability and Accessibility Standards**

Several content-focused technologies now enable organizations to share and reuse learning content. These technologies include XML (Extensible Markup Language), Reusable Learning Objects (RLO), and open connectivity standards such as the Sharable Courseware Object Reference Model (SCORM). XML, a programming language used to structure and describe data understood by different software applications, enables learning content to be indexed and reused based on its specific characteristics and attributes.<sup>9</sup> This "data about data," more formally known as "metadata," provides the basic building blocks for content reusability. While XML provides the physical mechanism, RLO strategy describes the appropriate way to "chunk" learning content into effective and reusable objects.<sup>10</sup> Using RLO to segment content appropriately, XML enables it to be published and delivered as required.

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<sup>9</sup> "XML in Action – Web Technology," William J. Pardi, Microsoft Press (1999, p.17).

<sup>10</sup> "Reusable Learning Object Strategy – Definition, Creation Process, and Guidelines for Building," Version 3.1, Cisco Systems, Inc. (April 2000).

While XML and RLO enable content to be delivered to the learner effectively, open standards such as SCORM and Aviation Industry CBT Committee (AICC) guidelines enable content to be used interchangeably with a wide variety of LMS and LCMS products. In SCORM usage, an RLO is equivalent to a Shareable Content Object (SCO), and becomes the reusable chunk that is passed via a conformant LMS and LCMS. Compliance with these standards is critical to enabling organizations to acquire and incorporate content from different sources (e.g., other government agencies and commercial vendors). In this way, these open standards provide organizations the maximum flexibility in acquiring and sharing learning content.

The Sharable Content Object Reference Model (SCORM) developed and sponsored by the Advanced Distributed Learning (ADL) initiative, is a set of interrelated technical specifications built upon the work of the AICC, the IMS Global Learning Consortium, Inc. (IMS), the Electrical and Electronics Engineers, Inc. (IEEE) and others to create one unified "reference model."<sup>11</sup> These specifications and guidelines have been integrated and adapted within the SCORM to meet DoD high level requirements of accessibility, interoperability, durability and reusability of Web-based learning content and systems.

The main focus of the SCORM at this time is the interoperability of learning content with learning management systems and consists of three main components:

- **Content Packaging** - provides a mechanism for identifying and packaging all necessary components of learning content so that they can be ported from system to system. In addition, it provides a way to describe the organization and structure of the learning content to achieve a particular learning context.
- **Run-Time Environment** - provides a common Application Program Interface (API) and Data Model to allow for consistent and interoperable communication of learning content to learning management system at run-time.
- **Metadata** - provides a mechanism to describe learning content at various levels that include content aggregations, sharable content objects (SCOs) and assets.

Similar to the Section 508 accessibility requirements mentioned regarding content (See Section 3.4.11, page 89), these requirements also apply to LMS and, to a lesser extent, LCMS products. Since users normally interact with an LMS to receive WBT, similar standards must apply to the LMS for the courseware and related information (e.g., catalog information and learner history) to be accessible.<sup>12</sup> Although many LMS and LCMS vendors have certified their products as Section 508 accessible, some are still in the process, and others have yet to pursue compliance. ODP strongly supports the interoperability and accessibility standards described above, and urges the First Responder community to also adopt them in their Blended Learning efforts.

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<sup>11</sup> See <http://www.adlnet.org> for information regarding SCORM and ADL.

<sup>12</sup> Since SCORM does not address content development issues outside of interoperability, it does not currently address Section 508 applicability to content creation, though it may be included in the future.

### 3.5.3 Content Delivery Systems

Modern content delivery systems are normally Web-based, Commercial-Off-The-Shelf (COTS) systems that may be characterized into two broad classes: Learning Management System (“LMS”) software that automates the administration of learning events, and Learning Content Management System (“LCMS”) software that enables authors to register, store, assemble, manage, and publish learning content for delivery via Web, print, or CD.<sup>13</sup> Both classes of products have come to prominence over the past five years, with many enterprise-class products blurring the line between the two.<sup>14</sup> Most simply, learners normally interact with an LMS (e.g., select a WBT course and register) while content authors interact with an LCMS (e.g., to develop new content or reuse existing content).

While LMS and LCMS products have different strengths, weaknesses, architectures, supported computing platforms, ability to manage and maintain metadata, licensing approaches, and levels of standards conformance, they normally address the following areas of functionality:

#### **General Areas of LMS Functionality**

- Learner Registration & Administration
- Training Event Management (i.e., scheduling, tracking, and WBT delivery)
- Curriculum & Certification Management
- Skills & Competencies Management
- Reporting
- Training Record Management

#### **General Areas of LCMS Functionality**

- Template-driven, collaborative content development
- Facilitated content management (i.e., indexing and reuse)
- Publishing
- Workflow integration
- Automated interface with LMS

In addition to LMS and LCMS products, many organizations employ a “Learning Portal” or single Web entry into their learning content and resources. While this gateway may redirect users to a number of different physical locations, it presents a single, consolidated interface and starting point for users interested in Blended Learning. The portal then becomes the “presentation layer” that links the various resources and systems (e.g., the LMS and LCMS) to the user.

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<sup>13</sup> “Making Sense of Learning Specifications & Standards: A Decision Maker’s Guide to th MASIE Center Learning Consortium Industry Report (March 8, 2002). See <http://www.masie.com> for more information.

<sup>14</sup> See <http://www.brandon-hall.com> for extensive research regarding current LMS and LCMS products.

While ODP is planning to offer LMS and LCMS services to the First Responder Community via an integrated Portal, it is intended to complement and interoperate with other systems used by the First Responder community. For this reason, ODP offers the following guidance to those organizations considering content delivery systems:

- Develop and maintain formal requirements throughout the acquisition and implementation process.
- Check for supported interoperability and accessibility standards as described above (e.g., SCORM, AICC, and Section 508). Also check any additional accessibility or Web standards local to your organization.
- Ensure compatibility with industry standard relational database management systems such as Oracle, Microsoft SQL Server, and IBM DB2.
- Check to see that the product's technical platform (e.g., Microsoft .NET or Sun Microsystems Java 2 Enterprise Edition – J2EE) and its throughput capacity (i.e., number of simultaneous users) are supported by your organization's technical infrastructure.
- Check the security and privacy regulations regarding content delivery systems within your organization. These systems may be considered a "system of records" as defined by the Privacy Act, and may require a formal System Security Plan (SSP) as indicated by the Government Information Security Reform Act (GISRA), OMB-A-130, and the Computer Security Act.

### 3.5.4 End-User Platform Considerations

As opposed to the standards and specifications applicable to other aspects of Blended Learning, end-user computing platforms in large, Internet-based audiences (such as the First Responder community) are difficult to predict and maintain. Though technology continually improves, large user populations are often slow to incorporate these advances. Unfortunately, this applies to connection speed (e.g., dial-up versus broadband), screen resolution, color depth, and even versions of popular Web browsers (e.g., Microsoft Internet Explorer and Netscape).

For this reason, and based on current industry practice, the following "de facto" end-user platform standards have evolved for delivering WBT via the Internet. While not the absolute "lowest common denominators," these criteria should be considered recommended minimum targets for WBT developers.<sup>15</sup>

#### Hardware

- Connectivity: 56 kbps dial-up modem
- Processor: Pentium-based 800 MHz PC

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<sup>15</sup> These recommended minimums are intended to benefit the preponderance of the First Responder community. Platforms at either end of the normal distribution (i.e., broadband power users and users of older platforms) may need to lower their expectations or upgrade some components.

- Memory: 128 MB RAM
- Monitor: 15-inch VGA Color
- Color Depth: 16-Bit
- Screen resolution: 800X600

**Software**

- Operating System: Microsoft Windows 95/98/2000/XP, Mac OS 8.x
- Browser: Microsoft Internet Explorer 5.x and Netscape 4.x
- Plug-ins: Microsoft Windows Media Player, Adobe Acrobat, and Macromedia Flash Player (bundled with IE 5.5 and above)

## 3.6 Process and Best Practices

### 3.6.1 Overview

This section will provide recommended process and best practices for each phase of the ODP course development process.

### 3.6.2 The Process

The ADDIE model, as described in Section 3.2.2, has milestones and best practices associated with each phase. This section describes the process and associated outputs for each phase of the ADDIE model: Analysis, Design, Development, Implementation and Evaluation.

#### 3.6.2.1 Analysis

The main purpose of analysis is to perform a systematic exploration of the way learners are performing a process now and the way that process should be performed.

As part of the Analysis phase, a kick-off meeting is conducted and attended by the project team. An effective kick-off meeting is critical for project success. The goals of this meeting include reviewing the project, gaining consensus on the project approach, schedules, resources available, learning objectives, and instructional strategy. Information Technology (IT) considerations are also discussed.

##### 3.6.2.1.1 Detailed Course Content Outline

A key output of this meeting is a detailed course content outline. This outline incorporates all Government Furnished Information (GFI) content to be represented in the storyboards. Objectives, modules, and topics are displayed. It will also identify a hierarchical list of all Terminal Learning Objectives (TLOs), associated Enabling Learning Objectives (ELOs), and a skill hierarchy to establish course learning objectives. This information will be used as the foundation for the Course Design Plan (see section 3.6.2.2.1, page 95).

See Appendix A (item 1) for an example of a Detailed Course Content Outline.

#### 3.6.2.2 Design

The design process consists of multiple steps with corresponding documents. The documents described below are the essential components in the creation of WBT courseware.

##### 3.6.2.2.1 Course Design Plan

The Course Design Plan is a synthesis of the data gathered in the Analysis phase. This document finalizes the course goals, learning objectives and detailed content outline for the courseware. It can include the following sections:

- **Course Design Strategy**  
An interactive design including course structure/flow chart and a design approach using themes and scenarios. The design approach can also include a discovery, learning, and problem-solving model.

- **Course Assessment Strategy**  
Includes types and frequency of questions and answers. This strategy can include practice questions embedded in content, Module Assessments at the end of each module, and a post-test. The types of questions used should be appropriate to the level of objectives and accreditation requirements.
- **Final Course Detailed Outline**  
Includes learning objectives (TLOs and ELOs), content to support the objectives, and the appropriate interactive design and assessment strategy.
- **Technical Functionality/Specifications**  
Includes technical and media considerations for the courseware such as audio/video, development software to be used, and additional plug-ins (if required).

See Appendix A (item 2) for an example of the Course Design Plan.

See Appendix C ( item 1) for the Document Review Checklist, a tool used to ensure documents are consistent, accurate, and complete.

#### 3.6.2.2.2 ODP Web-Based Style Guide

The ODP Web-Based Style Guide identifies a well-defined set of standards for courseware design, development, and production. Considerations to be identified include: design standards (courseware strategy, interface design standards, content organization, etc.); development standards (storyboard standard and templates, screen templates, screen development standards, etc.); and production standards (media elements, programming standards, and any additional integration requirements such as links to informational Websites).

#### 3.6.2.2.3 Prototype Development

The prototype is a small section of WBT that uses actual content to present the design concept and functionality of the entire course. The prototype provides an opportunity to review and comment on a section of the course before full storyboard design begins.

See Appendix C ( item 4) for the Course Review Checklist.

##### 3.6.2.2.3.1 Purpose of the Prototype

The purpose of the prototype is to provide a set of screens representing the proposed look and feel of the design. This allows the project team to review and comment on a small segment of work before full-scale production begins. The development process for the prototype should adhere to the same guidelines proposed for developing the complete courseware.

Following the prototype review, full-scale production is then based on the prototype and the project team feedback. Prototype development is recommended, as this process significantly increases the likelihood that the final product will be acceptable, and in accordance with all previously determined standards.

#### 3.6.2.2.3.2 *Prototype Content*

The prototype consists of the content required to teach a single ELO. The objective selected should not be an introductory topic. The prototype must reflect the same design concept, functionality, and characteristics of the final product. The prototype should be representative of the most robust features of the web-based course and contain the highest level of interactivity as specified in the Course Design Plan and the ODP Web-Based Style Guide.

The prototype features examples of all final product characteristics, as described in the Course Design Plan, including the following:

- Video (if appropriate)
- Audio (if appropriate)
- Navigational paths
- Templates
- Animation
- Graphics

The prototype also illustrates:

- Screen Designs
- Media Conventions
- Learner Controls
- Instructional Strategies
- Bookmark Functions (as appropriate)
- Interactivity

#### 3.6.2.2.3.3 *Prototype Process*

The prototype process begins with the selection of appropriate course content. Course content selection is based on criteria established by ODP.

When the topic has been selected, a storyboard for the prototype topic will be developed, reviewed, and approved or revised, as appropriate. Once the storyboard has been approved, prototype production can begin.

#### 3.6.2.2.3.4 *Prototype Delivery*

The prototype should be executable on the appropriate server location. Comments on the prototype will be incorporated into that lesson as well as applied to the rest of the course, as appropriate.

#### 3.6.2.2.4 *Storyboard Process*

Storyboards are developed based on the standards and content described in the Detailed Course Content Outline, the ODP Web-based Style Guide and the Course Design Plan. The project Subject Matter Experts (SMEs) review the storyboards and provide comments to the developer for revision.

See Appendix C (items 2 and 3) for the Storyboard Review Checklist and the Assessment Item Review Checklist. These tools ensure the storyboards are consistent and complete and the assessment items accurately reflect the objectives.

Appendix B provides the corresponding Storyboard Templates (Portrait, Landscape, and Full Screen).

##### 3.6.2.2.4.1 *Storyboard Development*

Storyboards provide a textual and visual description of content, graphics, animations, and other media elements.

##### 3.6.2.2.4.2 *Storyboard Requirements*

Storyboard templates provide an efficient tool for designing course content and creating a comfortable learning environment by maintaining a standard for text and graphic placement on the screen.

See Figure 13, Figure 14, and Figure 15 on the subsequent pages for storyboard template examples. The examples provided on subsequent pages are graphic reproductions and do not reflect the actual storyboard dimensions.

Standard graphic and text placement is:

- Portrait – Text on left, graphic on right.
- Landscape – Text on bottom, graphic on top.
- Full Screen – Text or graphic occupies full screen.

**Figure 13. Portrait Storyboard Example**

Date:	5/16/02	Storyboard File Name:	226_02	Version #	5.0
Storyboard Writer:		Page	2	of	3
Storyboard Reviewer:		Review Date:			
Course:	Introduction to Permit-Required Confined Spaces for General Industry	Course #	226		
Module:	Confined Space	Module #	02		
Topic:	Large Enough to Completely Enter	Topic#	02		
Screen:	Large Enough to Completely Enter	Screen #	070		

2 of 3

Confined Space/ Large Enough to Completely Enter

Large Enough to Completely Enter

The first criterion is met if the space is large enough for a worker to completely enter and perform work. Confined spaces present special hazards because of the difficulties involved in exiting from them. If complete bodily entry into a space is not possible, then exiting the space is not an issue. Therefore, if a space cannot be entered completely, it is not a confined space.

It does not matter how cramped a space is; if a person can enter completely and perform work, it is covered by the standard.

**Drawing #1:**  
Use a vault. Make one hatch too small to get into. Include person who can't get into the space, can only stick head in.  
(Use Hammer CD: lift3wetside.jpg and lift1.jpg as reference.)

**Drawing #2:**  
Same vault. Make hatch larger. Show cross-section with person who is all the way into the space.

**Caption:** This space is large enough to completely enter.

Click the image to learn more.

Programmer Notes:	
User instructions:	
Back:	060
Forward:	083
Graphic/Animation File Name:	Audio File: <span style="background-color: gray; color: gray;">          </span>
Graphic Notes:	See graphic box above.
Correct Feedback Pop-up Text:	If correct Branch to:
Incorrect Feedback Pop-up Text:	If incorrect Branch to:

**Figure 14. Landscape Storyboard Example**

Date:	5/16/02	Storyboard File Name:	226_02	Version #	5.0
Storyboard Writer:		Page	2	of	3
Storyboard Reviewer:		Review Date:			
Course:	Introduction to Permit-Required Confined Spaces for General Industry	Course #	226		
Module:	Confined Space	Module #	02		
Topic:	Not Designed for Continuous Human Occupancy	Topic #	04		
Screen:	Human Occupancy	Screen #	200		

Confined Space/ Not Designed for Continuous Human Occupancy	2 of 3
Human Occupancy	

Use our vented vault scene. Show blower coming into space (re-use scene from 070), highlight the blower. Show workbench with person. Highlight the work bench.

**NOTE to Artist:** We will call for use of this vault on many subsequent screens in the course. DO NOT use the blower unless specified, as it is on this screen.

In order for a space to be designed for human occupancy, it *does not* mean that human occupancy is the primary function of the space. Although the distinction between the "primary function" and the "design" of a space may seem inconsequential, **focus** should be placed on the **design** of the space, which is the **key** to whether a human can **occupy** the space under **normal operating conditions**.

Click on the highlighted items to learn more.	
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Programmer Notes:	
User instructions:	
Back:	180
Forward:	210
Graphic/Animation File Name:	Audio File:
Graphic Notes:	
See graphic box above.	
Correct Feedback Pop-up Text:	If correct Branch to:
Incorrect Feedback Pop-up Text:	If incorrect Branch to:

**Figure 15. Full Screen Storyboard Example**

Date:	5/16/02	Storyboard File Name:	226_02	Version #	5.0
Storyboard Writer:		Page	1	of	4
Storyboard Reviewer:		Review Date:			
Course:	Introduction to Permit-Required Confined Spaces for General Industry	Course #	226		
Module:	Confined Space	Module #	02		
Topic:	Knowledge Check	Topic #	06		
Screen:	Knowledge Check Introduction	Screen #	230		

Confined Space/Knowledge Check		1 of 4
Knowledge Check Introduction		

When completing the Knowledge Check, keep the following in mind:

- The questions are self-paced. You can take as much time as you need to complete each question.
- There are 3 questions in this Knowledge Check. You must obtain 100% to successfully complete the Knowledge Check.
- After completing all questions, you will receive a Knowledge Check Summary screen. This Screen will display the question with "correct" or "incorrect" beside each question.
- For each incorrect question, you will first review the lesson screen(s) relevant to the question. Then, you will retake the question. You will continue this process - review material, retake the question - until you have successfully answered all questions.

Click the FORWARD button to continue.	
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Programmer Notes:	
User instructions:	Click the FORWARD button to continue.
Back:	Disabled
Forward:	240
Graphic/Animation File Name:	Audio File:
Graphic Notes:	
Correct Feedback Pop-up Text:	If correct Branch to:
Incorrect Feedback Pop-up Text:	If incorrect Branch to:

**3.6.2.2.4.3 Header and Footer**

The following information describes the header and footer sections of the storyboard template.

**The Header Section**

**Date** - The date the storyboard is created or changed. Each time the Date changes, the Version # and Storyboard Reviewer fields should be updated accordingly.

**Storyboard File Name** - The storyboard file name includes the course number (3-digits) and module number (2-digits) with each separated by an underscore (\_). The storyboard file name is a shorthand reference to the storyboard and should not be confused with the screen name. The screen name is comprised of the following 10-digits: course number, module number, topic number, and screen number.

**Version #** - The first version number for a storyboard file is 1.0. The version number must be updated to reflect any storyboard modifications (e.g., 1.2, 1.3, etc.). After SME comments have been incorporated, the storyboard should then receive the designation of Version 2.0. Each time the Version # changes, the

Date and Storyboard Reviewer fields should be updated accordingly.

**Storyboard Writer** - This field includes the complete name of the persons responsible for writing the storyboards. Do not use initials.

**Storyboard Reviewer** - This field contains the complete name of the person reviewing the storyboards. Do not use initials. Each time the Storyboard Reviewer makes changes, the Date and Version # fields should be updated accordingly.

**Date Comments Received** - This field contains the date on which the reviewer received the storyboards.

**Course and Course #** - These fields include the complete course name in the first space and the corresponding course number in the adjacent space. If the course name needs to be abbreviated, ensure that it is easily identifiable. The course number should be a 3-digit number.

**Module and Module # (if the content warrants division into modules)** - These fields include the complete module name in the first space and the corresponding module number in the adjacent space. If the module name needs to be abbreviated, ensure that it is easily identifiable. The module number should be a 2-digit number (e.g., 01, 02, 03).

**Topic and Topic #** - These fields include the complete topic name in the first space and the corresponding topic number in the adjacent space. If the topic name needs to be abbreviated, ensure that it is easily identifiable. The topic number should be a 2-digit number (e.g., 01, 02, 03).

**Screen and Screen #** - These fields include the screen name that is based on the screen type, for example, Module Menu, Practice Screen, or Content Screen. This is not to be confused with the 12-digit number that is the unique identifier for the screen.

The screen number should be a 3-digit number starting with 010. The numbering should continue in increments of 10. Any screens inserted during the editing process should be numbered so as not to disrupt the existing order of the screens (e.g., 010, 011, 012, 020, 030).

### **The Footer Section**

**Programmer Notes** - This field includes any information the programmer needs to accurately program the storyboard. This information may pertain to the placement and movement of text on the screen as well as hyperlinks and any interactions that the plug-ins and additional software may facilitate.

**Pop-up Text** - The pop-up text field provides the definition for the hyperlinked term(s) the learners click. The terms should appear at the beginning of the first sentence of the definition.

**Back** - This field contains the 3-digit number of the screen to which the learner will move when the Back (<) button is selected. Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

**Forward** - This field contains the 3-digit number of the screen to which the learner will move when the Forward (>) button is selected. This should include the logical progression if the learner does not select any hyperlinks. Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

**Correct Feedback Pop-Up Text (for Practice Exercises only)** - This field contains the actual text (as it should be viewed on a screen) that will accompany practice items that are answered correctly. Learners will be informed they answered the question correctly.

**If correct Branch to (for Module Assessments only)** - This field includes the 3-digit screen number for the next Module Assessment question (this field only pertains to the Module Assessments). Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

**Incorrect Feedback Pop-Up Text (Practice only)** - This field includes the actual text (as it should be viewed on a screen) that will accompany practice items that are answered incorrectly. Learners will be informed they answered the question incorrectly followed by the correct response.

**If incorrect Branch to (Module Assessments only)** - This field includes the 3-digit screen number of the screens that will be shown during remediation (this field only pertains to the Module Assessments). Remember that if any screens are inserted during the editing process, the screen numbers in this section must be adjusted accordingly.

## Display

The display section is located between the header and footer sections in the storyboard template. The topics provided below describe how to complete the display section.

**Lesson Title/Topic Title** - These fields include the title of the lesson and the title of each topic as they appear on the screen.

**Page numbers (# of #)** - This field contains two numbers that indicate where the learner is in each topic and the number of screens remaining in that given topic.

**Screen title** - This field contains the title of the screen as it will appear on the screen.

**Screen text** - This field contains the actual text as it is to appear on the screen. When using the portrait template the text is on the left. When using the landscape template the text is on the bottom.

**Graphic description** - This field contains a description of the graphic, picture, or illustration. The description can include a reference for where to find the image, graphic file names, directions on animation, and labels that will appear with the graphic. When using the portrait template the graphic is on the right. When using the landscape template the graphic is on the top.

All graphics and animations should be explained in sufficient detail for reviewers to recognize the item and to make decisions about appropriateness.

Also include any audio/video requirements in this section. If there is an audio (narration) requirement, provide the script, if there is a video requirement; provide the appropriate detail description and/or the source file.

**User Instructions** - This field contains screen specific prompt text directing the learner what to do next.

#### *3.6.2.2.5 Development*

Course development begins when the final Storyboards are reviewed and approved. Lessons are programmed and reviewed according to the storyboard content. The course development is complete once all of the lessons have been reviewed and approved.

Figure 16,

Figure 17, and Figure 18 display the screens created based on the storyboard examples above.

**Figure 16. Screen Created Based on the Completed Storyboard (Portrait)**



Figure 17. Screen Created Based on the Completed Storyboard (Landscape)

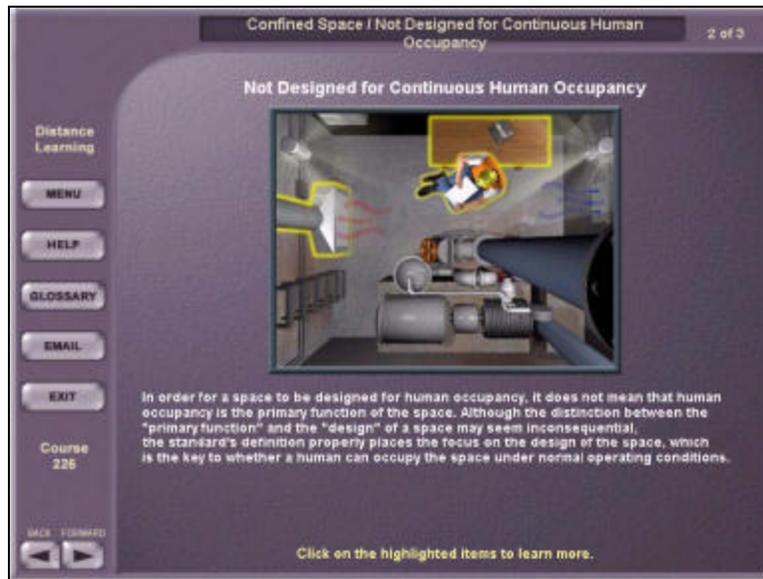
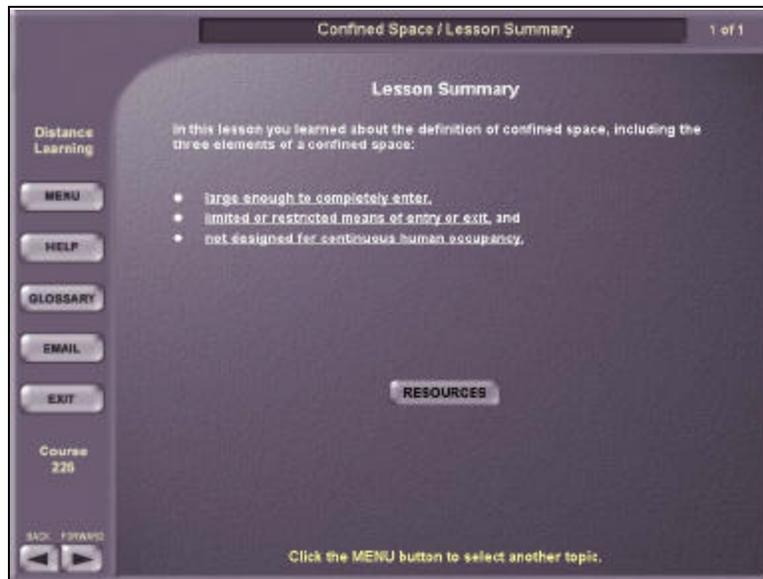


Figure 18. Screen Created Based on the Completed Storyboard (Full Screen)



### 3.6.2.2.6 *Implementation*

In the Implementation phase, the course is loaded onto the appropriate courseware server. Functionality testing is conducted to ensure that the course is functioning properly in the appropriate server environment.

### 3.6.2.2.7 *Evaluation*

Following implementation, two primary aspects of the course are evaluated with a sampling of the target audience. First, the evaluation validates that the learners have achieved the objectives as stated in the Course Design Plan and Course Detailed Outline. Next, the usability of the course (the learners' ability to interact effectively with the course) is then evaluated. These evaluation elements are specified in an Evaluation Plan, including user surveys, for formal review and approval by ODP.

See Appendix C (item 4) for the Course Review Checklist tools used to ensure each course is complete, accurate, consistent, and functions correctly.

#### 3.6.2.2.7.1 *Evaluation Plan*

The evaluation plan should be established in the Design phase and executed after implementation is complete. The objectives of the evaluation are to gather and document qualitative and quantitative data to determine whether the course content is instructionally sound, corresponds to stated learning objectives (detailed in the Course Design Plan and Course Detailed Outline), and learners are able to achieve the instructional objectives upon completion of the course. Data gathered is also used to determine the "user-friendliness" and usability of the WBT product. This includes determining whether the following is true:

- The navigation is easily understood and used by participants without explanation beyond that provided by the product itself.
- The courseware design is appropriate (font, pitch, color schemes).
- Instructional material is presented in a consistent manner.
- The terminology used is clear and understandable.

See Appendix A (item 3) for an example of an Evaluation Plan.

#### 3.6.2.2.7.2 *Evaluation Report*

An Evaluation Report is developed to record the results of the evaluation process. The report findings are based on the factors documented in the evaluation plan for the course. An evaluation report includes the following elements:

- Evaluation methodologies
- Evaluation findings
- Recommendations

See Appendix A (item 4) for an example of an Evaluation Report.

## 4.0 BLS Implementation: Blended Learning Panel

### 4.1 Overview

Blended Learning will improve support for First Responders in a number of ways:

- Increased availability and accessibility of training (any time, any place)
- Ability to share and reuse training content
- Reduced classroom time by providing prerequisite learning materials
- Increased training effectiveness by institutionalizing best practices

While Blended Learning offers these and other improvements, the transition to the new model is not straightforward, especially for an audience as large and diverse as the First Responder community. Technologies continue to change, infrastructure challenges still exist, and design, accessibility, and interoperability standards are quickly coming to the forefront of Distributed Learning.

Recognizing both the rewards and challenges posed by the new model, ODP plans to facilitate the transition by establishing a Blended Learning Panel composed of training partners<sup>16</sup>, and by providing several industry best practice guidelines for implementing the new model. These steps are intended to foster a collaborative environment by further synchronizing First Responder training efforts.

### 4.2 Purpose

The purpose of this section is to outline a framework for how the Blended Learning Panel should function to support the vision presented above. The document recommends specific Panel objectives, membership, responsibilities, and operating protocols to address both short and longer-term goals.

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**Note:** Elements in this document will be refined as the Panel evolves over time.

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### 4.3 Blended Learning Panel

The primary purpose of the Panel is to maximize First Responder training through a Blended Learning approach. More specifically, the Panel intends to achieve the following (each of these objectives are aligned with the *ODP Training Strategy*, as noted below):

1. **Promote a common understanding and appreciation of Blended Learning methods; refine and finalize the draft Blended Learning guidelines**

Training that provides opportunities to apply specific job knowledge (i.e., practice and exercise) is the “preferred mode of training”. Blended Learning can be as effective (if not more so) by addressing diverse learning styles and offering opportunities for “practice to proficiency.”

2. **Improve the efficiency, consistency, and quality of First Responder training.**

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<sup>16</sup> Training Partners consist of NDPC and other organizations providing First Responder training.

As stated in the ODP Training Strategy, much of the current First Responder training content is at the knowledge or comprehension cognitive level. Current data has shown (especially at the lower cognitive levels) that an e-Learning implementation can increase learning (by 56%), learning consistency (50-60%), and content retention (25-50%).

**3. Identify specific First Responder training targets for which Blended Learning can be applied.**

There are 152 tasks identified in the ODP Training Strategy. More tasks may be added as “new threats and responses are articulated,” requiring more flexible and effective modes of training delivery.<sup>17</sup>

**Implement Blended Learning solutions in a timely and cost effective manner.**

There are 32 complex tasks identified in the ODP Training Strategy. These tasks “generally involve coordination among and between disparate agencies and organizations...”<sup>18</sup>

**4. Expand the range of media available to provide training when and where it is needed.**

By implementing a strategy that combines instructor-led training with Blended Learning media, and evaluating results at the point of training, ODP and its training partners can address the needs of First Responders on a 24/7 basis.

#### 4.4 Membership

Preliminary Panel involvement is expected to include ODP and training partner personnel. Panel members will be encouraged to support the following goals:

- Maintaining commitment and support for the Panel and its purpose.
- Reviewing and adding insight into the Blended Learning guidelines.
- Internalizing the strategy and planning for distribution to the field.
- Coordinating the development and delivery of Blended Learning content.
- Measuring results by developing a common set of progress metrics.
- Standardizing guidelines within their respective organizations.

ODP envisions Panel membership consisting of the following:

- Office for Domestic Preparedness (ODP)

*Training Partners*

- New Mexico Institute of Mining and Technology (NMT)
- Center for Domestic Preparedness (CDP)

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<sup>17</sup> ODP Training Strategy, Page 11

<sup>18</sup> ODP Training Strategy, Pages 14-15

- Louisiana State University, Academy of Counter-Terrorism Education (LSU)
- Texas Engineering Extension Service (TEEX), National Emergency Response and Rescue Training Center (NERRTC)
- U.S. Department of Energy Nevada Test Site (NTS), National Center for Exercise Excellence (NCEE)
- Michigan State University (MSU)
- National Terrorism Preparedness Institute (NTPI), St. Petersburg College
- Virtual Medical Campus (VMC), West Virginia University
- Pine Bluff Arsenal (PBA)
- Dugway Proving Ground (DPG)

#### *Professional Organizations*

- National Sheriffs Association (NSA)
- International Association of Fire Fighters (IAFF)

#### *Advisory Members*

- National Institute of Justice
- OJP, Office of the Chief Information Officer (OCIO)
- Existing Contractors (i.e., lead program manager, where needed)

The Panel body should consist of senior training staff (i.e., Directors or Principal Investigators) with the authority to represent and make decisions regarding their respective organizations. Each representative should have knowledge of current training efforts and an interest in understanding how Blended Learning can be applied to enhance their efforts.

Advisory members can include representatives from the private and public sectors. Their role will include providing specialized knowledge and expertise by identifying future training requirements.

### 4.4.1 Roles and Responsibilities

Figure 19 (below) identifies Panel responsibilities.

**Figure 19. Functional Roles and Responsibilities**

	ODP	Training Partners	Professional Organizations	Advisory Members
<b>Primary Role</b>	Meeting facilitation and oversight	Senior level representation and support; provide technical and instructional design expertise		Provide technical and subject matter expertise
<b>Responsibilities</b>	<ul style="list-style-type: none"> <li>• Coordinate meetings</li> <li>• Capture and address member issues</li> <li>• Document decisions and best practices</li> <li>• Communicate decisions and progress</li> <li>• Ensure Panel objectives are achieved by managing overall implementation efforts</li> </ul>	<ul style="list-style-type: none"> <li>• Participate/support panel meetings</li> <li>• Understand and champion the Blended Learning guidelines</li> <li>• Implement the Blended Learning guidelines (assessing implementing issues as they arise) working with ODP</li> <li>• Coordinate efforts with other panel members to ensure solutions agreed to are implemented effectively</li> <li>• Identify future Blended Learning training opportunities and resources needed</li> <li>• Evaluate training effectiveness; ensure user needs are met with end products</li> <li>• Communicate progress</li> </ul>		<ul style="list-style-type: none"> <li>• Participate in panel meetings, as needed</li> <li>• Help develop new content and/or validate existing content</li> <li>• Identify/assess implementation issues</li> </ul>

### 4.4.2 Metrics

The Panel will consider a variety of factors to gauge their progress. These factors include, but are not limited to, the following:

- Partners who embrace the Blended Learning guidelines.
- Instructors that have integrated Blended Learning into their curriculums.
- Student evaluation of blended content.
- Number of blended courses developed.
- Number of students trained via blended media.
- Students’ ability to complete prerequisite training at the job site.

A longer-term progress indicator would be students’ ability to apply knowledge from the classroom to the job site.

### 4.4.3 Near-term Concept of Operation

At a high level, the Panel will proceed as follows:

- Meetings will be held quarterly, with ad-hoc meetings scheduled as necessary to address specific issues.
- ODP will provide management and coordination of Panel activities to help build momentum for the Blended Learning guidelines.
- Progress and status information will be posted to the ODP portal site. This password-protected site will help promote collaboration and serve as a coordination point for Panel communication.
- When Panel consensus is not possible, decisions will be based upon majority rule.
- Members will be requested to attend all meetings. If unable to attend, an authorized alternate should be identified.
- ODP will work with the Panel to disseminate information to stakeholders regarding Panel decisions.
- More detailed information will be provided in a separate Implementation Campaign document, including:
  - ⇒ Panel communication strategy
  - ⇒ Read-ahead materials (to prepare for Panel discussions)
  - ⇒ Meeting agendas and follow-up strategy

### 4.4.4 Near-term Focus – Blended Learning Guidelines

The Panel's initial focus will be to finalize and adopt the Blended Learning guidelines. The Blended Learning guidelines will provide ODP and its training partners with benchmarks and direction for developing future training content (highlighted in Figure 20, below).

**Figure 20. Blended Learning Guidelines Critical Path (Near-term)**



The guidelines referenced in Step 1 (above) include the following elements currently under development:

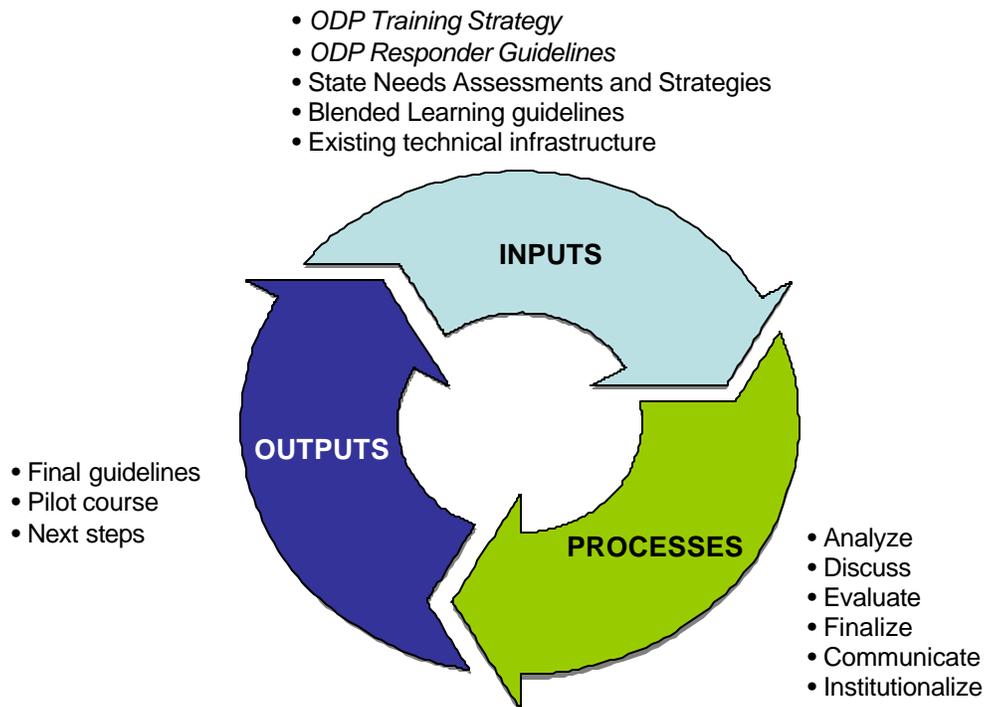
5. A strategy for Blended Learning (tools and best practices for developing training content).
6. A Delivery Methods Analysis and Selection Tool.
7. A Web-based Style Guide.
8. An Implementation Campaign to help stakeholders understand and support the guidelines.

The Panel will then work to finalize these guidelines over the following months.

#### 4.4.5 Core Processes

In addition to adopting the approved Blended Learning Guidelines, Figure 21 (below) captures the other essential inputs, processes, and outputs of the Blended Learning Panel.

**Figure 21. Panel Core Processes**



**Inputs** into Panel discussions will include the State Needs Assessments and Domestic Preparedness Strategies, the *ODP Training Strategy*, the *ODP Responder Guidelines*, the Blended Learning guidelines, and the existing technical infrastructure (both capabilities and constraints).

Panel **processes** will include the following:

- Analyze current training requirements and audience needs.
- Discuss merits and drawbacks of the Blended Learning guidelines.
- Evaluate supporting technologies and map to learning objectives.
- Finalize the Blended Learning guidelines.
- Communicate and advocate the guidelines to stakeholders.
- Implement and institutionalize the guidelines.

The expected **outputs** from Panel discussions include:

- Final Blended Learning guidelines.
- Identification of a pilot course to apply the guidelines. Criteria for pilot course selection can include:
  1. Content currently provided via traditional methods and/or offered to a large number of participants.
  2. Instructional goals shared by many if not all First Responders.
  3. Some content that can be delivered without live instructor-led facilitation.
  4. Content that should be delivered consistently and may be dynamic rather than static.
  5. Some learning objectives that may be achieved primarily through independent study.
  6. Requirement of after training access to materials as a job aid or refresher.
- Next steps and action plans including timelines, resources, and budgets.

#### **4.4.6 Additional Considerations**

The following areas will receive special consideration in support of the core Panel processes:

##### *4.4.6.1 Decision Making*

Time should be built into the Panel decision making processes for members to obtain input and approval from their respective stakeholders. Final products should be “branded” for consistency and posted to the portal site.

##### *4.4.6.2 Issue Resolution*

Outstanding issues should be submitted to ODP as agenda items for upcoming meetings. This will help ensure that member issues are properly tracked and addressed.

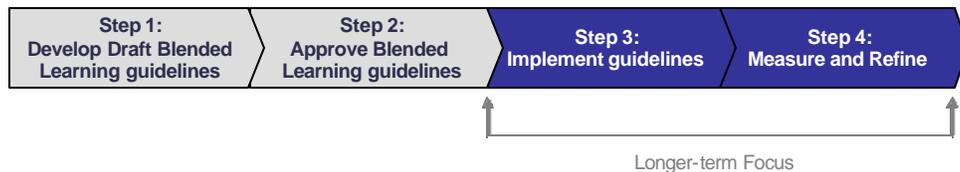
##### *4.4.6.3 Communication and Reporting*

While the Panel will provide regular progress reporting, much of the Panel’s work will involve regular e-mails, meetings, and phone calls throughout the year. This interim communication is essential for maintaining progress and keeping the membership apprised of ongoing panel activity.

### 4.4.7 Long-term Concept of Operation

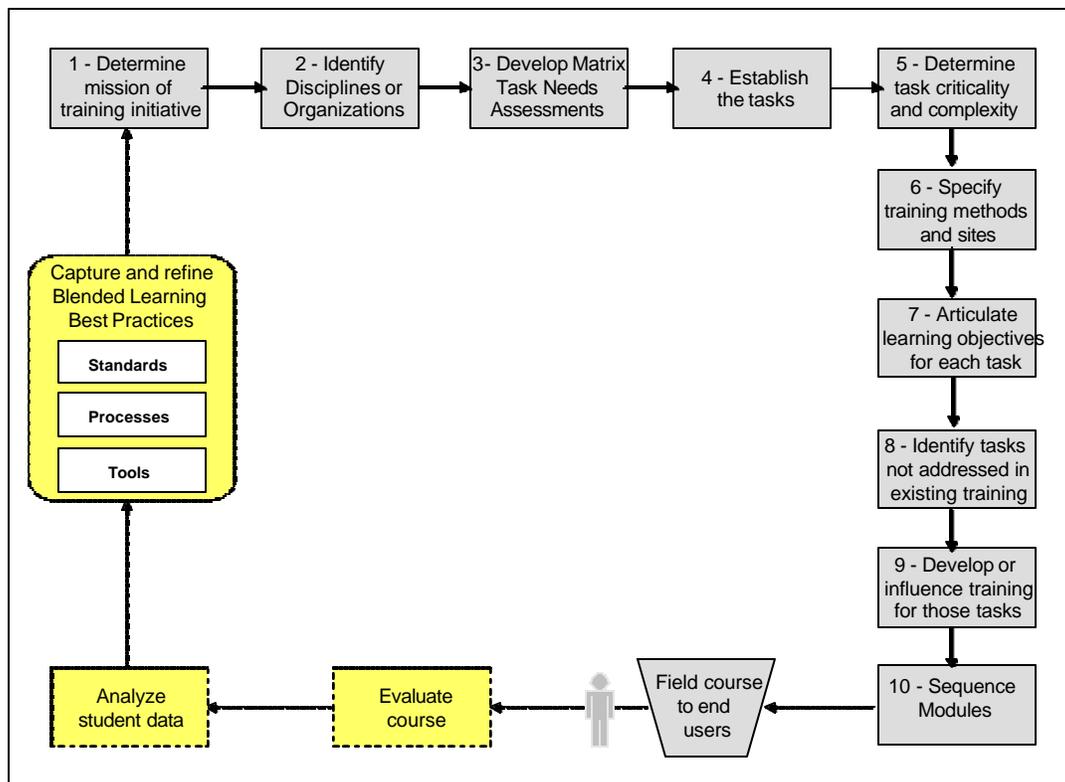
Once the Blended Learning guidelines are finalized, the Panel will need to shift its focus towards implementation and maintenance (see Figure 22, below). These issues include, but are not limited to, identifying traditional courses to convert to Blended Learning, defining milestones and delivery schedules, and overall resource management.

**Figure 22. Blended Learning Guidelines Critical Path (Long-term)**



To maximize the effectiveness of Blended Learning, a “closed-loop process” is recommended for capturing student evaluation data and applying best practices and lessons learned into front-end course development efforts. These process steps are highlighted in Figure 23 (below).<sup>19</sup>

**Figure 23. Future Training Development State**



<sup>19</sup> Steps 1-10 are taken from the “Model Process for WMD Training,” *ODP Training Strategy*, Page 12

The Panel can be instrumental in supporting this model by:

1. Continuing to define and improve Blended Learning standards, processes, and tools, including the use of a centralized portal as the single point of access for First Responder training.
2. Capturing, analyzing, and communicating best practices (including the results of industry benchmarking) to other training partners and instructors to provide them with new methodologies and techniques for Blended Learning course development and delivery.
3. Committing instructors and technical resources to facilitate delivery of Blended Learning courses.
4. Establishing training priorities and a transition schedule for Blended Learning application (ensuring that all training requirements have been identified and prioritized).
5. Consolidating individual programmatic functions and activities common to all Blended Learning initiatives into an integrated management approach. This approach will ensure quality, timeliness, cost efficiency, and compliance with industry standards (e.g., SCORM and Section 508).
6. Evaluating Blended Learning training effectiveness using standardized criteria and providing metrics to support future efforts.
7. Driving future technology requirements such as a Learning Management System (and Learning Content Management System) to manage student information and maximize content sharing, reuse, and other platforms and systems for delivering Blended Learning courses.
8. Defining staff development requirements and managing efforts to improve the skills of all participants involved in Blended Learning training.
9. Transitioning to new roles and phasing in the infrastructure needed to support the Blended Learning guidelines.

By partnering in implementing the Blended Learning guidelines, ODP and its training partners can offer training that is effective, engaging, and accessible to all First Responders when and where it is needed.

## 4.5 Transition and Change Management Steps

As ODP and its Training Partners accept the need for a Blended Learning approach, their next challenge will be to effectively implement this change within their organizations. As advocates of the new model, these organizations must realize that the transition process to Blended Learning is gradual and will be met with resistance by those who are not convinced of the benefits of the new model. Instilling a sense of urgency and understanding of the benefits to be achieved by participating in the new model will be critical to future success. This effort will require active leadership, project management, and the ability to overcome the natural resistance to change within a short timeframe.

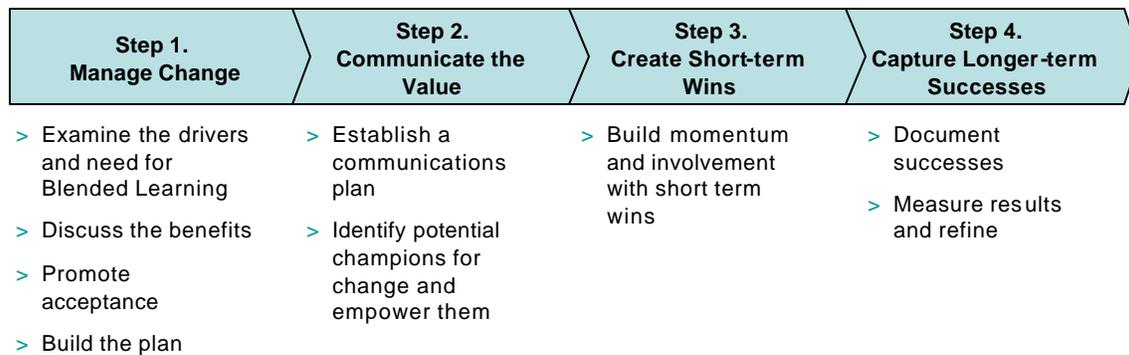
### 4.5.1 Objectives

The goal of this section is to provide additional concepts and tools for ODP and the Training Partners to achieve the following:

- Short-term: Facilitate acceptance and advocacy of the Strategy for Blended Learning and its components among the members of the ODP Stakeholder Panel.
- Longer-term: Provide tactics and tools to aid Panel members as they implement the strategy within their respective organizations.

To begin transitioning to the new model, a “roadmap” is needed so that Panel members can effectively lead their organizations through the change. Figure 24 (below) provides the high-level steps and tasks needed to facilitate the change.

**Figure 24. Change Management Roadmap**



Note: It is critical to find an initiative or pilot project that has broad appeal and impact so that others can clearly see the benefits of Blended Learning. Incident command is one such initiative and should be further explored.

### 4.5.2 Implementation Roadmap

On the following pages, a high-level implementation path for the Blended Learning strategy is described. Processes and tools that support these steps are identified and discussed.

#### 4.5.2.1 *Step One: Manage Change*

Successful change management campaigns start with a fundamental belief in the need and urgency for change. If Panel members do not believe that Blended Learning can enhance the quality, consistency, and availability of training to First Responders, the implementation will fail and valuable time and resources will be wasted.

Step One is designed to build acceptance and support for the Blended Learning Strategy, starting with the members of the ODP Stakeholder Panel. Major tasks to be completed in this step include the following:

- **Examine the drivers** - to understand the rationale and need for the Blended Learning Strategy. The major points of improving training quality, accessibility, consistency, throughput, and meeting the mission of preparing First Responders, should be emphasized over others.
- **Discuss the benefits** - associated with the effective use of Blended Learning technologies. These benefits are called out in Section 1.2 of this document. It is important to reemphasize here that Blended Learning is meant to complement and enhance, not replace, traditional classroom instruction.
- **Promote acceptance** - of Blended Learning as a desirable method of training using industry best practices in Instructional Systems Design and development. These best practices will consist of the Delivery Methods Analysis Tool and Web-based Style Guide as discussed in Section 3.0, among others.
- **Build the plan** – for how to apply Blended Learning to First Responder training efforts, and start moving each member organization in the desired direction. The Stakeholder Panel will provide the forum where implementation best practices can be shared so that each member approaches implementation from a common baseline.

#### 4.5.2.2 *Step Two: Communicate the Value of Blended Learning*

Once Panel members understand and support the need for Blended Learning, they must be equipped with compelling reasons for adopting the new training model, as well as knowledge of how to diffuse the elements that can prevent the change from taking hold within their organizations. Step Two would be designed to help these organizations begin their transition process to the new model using the following components:

- “Edu-marketing” Campaign
- Identification of champions to lead the change

##### 4.5.2.2.1 *“Edu-marketing” Campaign*

An “Edu-marketing” campaign may be needed to support the initiative. This campaign would consist of a series of communications activities – each designed to build awareness, understanding, urgency, and support for the Blended Learning Strategy. Constant communication will remove the mystery, uncertainty, and anxiety surrounding the overall strategy and develop enthusiasm within each member organization.

The campaign should be designed with the following elements in mind:

- **Messaging** - Campaign messaging should simply and effectively explain what the change is, why it is needed, and the benefits for the end user. It should negate the primary reasons for resisting the change without alienating the opposition. It should also establish early on that the implementation process will be met with successes and failures, but stay focused on the end goal of meeting the mission of preparing First Responders.
- **Mediums** - Multiple approaches can be used from print collateral, use of an Intranet, to focus groups and workshops. Media should be flexible enough to accommodate change, as the transition process unfolds.
- **Style and tone** - Each medium should reinforce one another to create a consistent effect, encourage dialog, build support, and minimize confusion.

Several communications approaches can be combined into an effective edu-marketing campaign:

- **“Transition Toolkit”** - a series of white papers, briefings, Internet resources and talking point documents that publicize the best practices and examples of successful Blended Learning as well as address the concerns of the community as they transition their curriculum to a Blended Learning Model.
- **Blended Learning Workshop** - A workshop designed to orient new participants to the Blended Learning Model, as well as to examine prejudices and correct misconceptions as the organization begins to transition its staff to blended media training delivery.
- **Use of New Technologies to Help People See the Vision** - as early as possible. New technologies should be introduced and used on a regular basis. They can be used to provide resources, communicate and share information and solicit feedback. Promotion of these tools will validate the usefulness of the new media and increase the comfort level with the new technology, enabling people to make better decisions and manage expectations (e.g., Web collaboration tools and Portals).

The output of this step would be a communications plan that defines the specific approaches to be used, timing, as well as resources needed for each component of the campaign. Once agreed to, the plan would be executed to get as many people as possible to embrace the change and make it a reality.

#### *4.5.2.2.2 Identify Champions for Change*

To support the Blended Learning initiative, each Panel member will need to build a team of champions who share the vision and can effectively influence others within their organizations. Champions should be selected using the same criteria defined in the Stakeholder Panel document. They should consist of both senior level staff who are empowered to make decisions, and functional staff who have the knowledge and interest in applying Blended Learning to training development efforts.

Once identified, champions will be responsible for the following:

- Promoting a unified voice for the change
- Coordinating the implementation of the new model working with the Stakeholder Panel (i.e., creating implementation plans, providing subject matter expertise, identifying risks and mitigation plans, etc.)
- Communicating change status
- Addressing issues and concerns, as they arise
- Ensuring participation, buy-in, and commitment towards the end goal

Champions must be armed with the tools and resources to understand the impacts of the new model and motivate others to support the transition process.

#### 4.5.2.3 *Step Three: Create Short-term Wins*

This focuses on the need to celebrate and communicate short-term successes early to build and sustain momentum. The only way to build participation and support is to demonstrate to people at all levels that the new Blended Learning model is working.

Plans are never perfect; change is constant – these will be the realities of implementing the new model. To manage the change process, champions will need to speak frequently to the organization regarding successes, issues of concern, and obstacles that have been overcome.

#### 4.5.2.4 *Step Four: Capture Longer-term Successes*

This step focuses on the need for continued analysis, measurement, and modification to ensure that the Blended Learning model adopted continues to effectively meet the needs of ODP and the training partners. As the model is implemented and continues to evolve, several elements will be required to ensure that the changes take hold:

- **Recording best practices and lessons learned** - To support change management, successes and failures should be captured and documented (using tools such as databases) for analysis and historical access. Best practices should be elevated to the Stakeholder Panel so that each member can learn from each other's successes and incorporate incremental changes into their individual planning processes.
- **Evolving Champions into Mentors** - Once the Blended Learning Strategy takes hold, champions will need to evolve from short-term proponents of the model to advocates for continual improvement. Champions will need the support of management to avail themselves as mentors and coaches for new Blended Learning development projects.
- **Building Communities of Practice** - Developments in technology and communication will continue to create training issues for the First Responder community. As a result, learning activities and modes of assessment must continue to be responsive to meet the needs of this community. By establishing a community of practice, educators will have a mechanism for sharing goals and interests, common practices and tools, and can develop a process that regularly reviews training programs to ensure their accuracy and effectiveness.

## Appendix A. Document Templates

### Detailed Course Content Outline

The following is an example of a module within a Detailed Course Content Outline.

#### Module 2: Confined Space

##### Topic A: Introduction

##### Module Description

This module thoroughly examines the definition of a confined space.

##### Module TLO

At the end of this module, you will be able to determine whether a space is a confined space.

##### Module Overview

###### a. Variety in confined spaces

In the last module you learned about the confusion surrounding what constitutes a confined space. Potential confined spaces do come in all shapes and sizes with all kinds of uses.

Use collage of as many confined spaces as possible from the module. See BNA video for good example.

Provide printable copy of list on 1-30 to 1-33 in Volume I.

###### b. Definition of confined space

To determine whether a space is a permit required confined space, you must first determined whether the space is a confined space. It is critical that you understand the definition of confined space, so that you can apply it correctly.

The definition of confined space is made up of three elements. You can think of each of these elements as a test. For a space to be considered a confined space, it must pass all three of the tests in the definition. Passing one or two of the tests does not make a space a confined space. Confined spaces pass all three tests.

You may be familiar with the fire triangle. You can think of these tests in the same way. Just as fire needs oxygen, fuel and heat, a space must have all three definition elements to be considered a confined space.

Show the fire triangle. Take one leg out, fire goes out. Show a triangle with all three definition elements around it. Animate the triangle sides building the triangle. Must meet all three definitions to be a confined space. If one leg is missing, it's not a confined space.

**Topic B: Bodily Entry****References:** IG-Definitions, pp. 11-17**ELO 2-1:** To identify spaces that meet the “bodily entry” test.**Instructional Strategy:** Text, graphic, pop-up text**Practice Strategy:** Multiple-multiple choice**1. Introduction**

Let’s take a look at the first test of a confined space.

Is the space “large enough and so configured that an employee can bodily enter

**2. Complete**

The standard applies only if complete bodily entry is possible. Confined spaces present special hazards because of the difficulties involved in exiting from them. If complete bodily entry into a space is not possible, then exiting the space is not an issue. Therefore, if a space cannot not be entered completely, it is not a confined space.

“While OSHA is concerned that spaces that are too small for complete bodily entry may pose hazards for employees, the Agency did not intend to cover such spaces under the permit space standard.” Federal Register, 1/14/1993, p. 4477.

**3. Cramped spaces**

Some spaces are sufficiently cramped to make extended stays unpleasant. The standard does apply to these spaces so long as a person can completely enter the space and perform work

**4. Examples**

Provide three visual examples of spaces that are confined and three that are not confined, with explanations: one average confined space, one cramped confined space, and one space that does not meet the standard.

**5. Distinction between “complete bodily entry” and definition of “confined**

Use pop-up to point out distinction.

**Topic C: Limited Entry****References:** IG-Definitions, pp. 13-18**ELO 2-2:** To identify spaces that meet the “limited or restricted entry or exit” test.**Instructional Strategy:** Text, graphics, simple animations, pop-up text.**Practice Strategy:** Multiple-multiple choice (graphic i.d.), multiple choice (graphic i.d.)

## 1. Introduction

Now, let's look at the second test of a confined space.

Does it have "limited or restricted means for entry or exit?"

## 2. Definitions of limited and restricted

What makes entry into these spaces limited or restricted?

The standard provides some examples of spaces with limited or restricted means of entry and exit: "tanks, vessels, silos, storage bins, hoppers, vaults, and pits."

[Definitions for hot links:

Limited: When an employee would be forced to enter or exit in a posture that might slow self-rescue or make rescue more difficult (FR 11/4/94, p. 55208)

Restricted: Restricted entry and exit means physical impediment of the body, e.g., use of the hands or a contortion of the body to enter into or exit from the confined space. (ANSI Z117.1-1995. Even though ANSI is cited here, this is OSHA's intent.)]

## 3. Identify confined spaces that have limited entry and exit

One useful way of determining whether a space has limited or restricted entry or exit is to ask the following questions:

*a. Does the employee have to use his or her hands to enter or exit the space?*

Provide visual example and explanation.

*b. Do you have to contort your body in any way to get into or out of the space?*

Provide visual example and explanation.

*c. Is the employee's entry into or exit from the space slowed down or impeded by physical obstructions (such as pipes, ductwork, walls, holes in the floor, flanges, etc.)?*

Provide visual example and explanation.

*d. Would the employee be forced to enter or exit in a posture that might slow self-rescue or make rescue more difficult?*

## 4. Special cases

### a. Ladders

#### i) General

Ladders usually constitute a limited or restricted means of entry.

Pop-up box for: "Ladders and temporary, movable, spiral, or articulated stairs will usually be considered a limited or restricted means of egress. Fixed industrial stairs that meet OSHA standards will be considered...when conditions or physical characteristics of the space...would interfere with the entrant's ability to exit or be rescued in a hazardous situation." CPL.2100, p. 22.

While stairs can be a limited or restricted means of entry or exit, fixed industrial stairs do not normally constitute a limited or restricted means of entry.

**Instructional Strategy:** Text, graphics, simple animations.

**Practice Strategy:** Multiple-multiple choice (graphic i.d.)

## **1. Introduction**

Now, let's look at the third test of a confined space.

Can we say that it is "not designed for continuous employee occupancy?" Let's look at this in two parts: "continuous" and "employee occupancy."

## **2. Continuous**

### **a. Definition**

Continuous human occupancy does not mean that a space must be continuously occupied. Rather, it means that the space could be occupied continuously under normal operating conditions.

### **b. Examples**

Think of an office - one doesn't occupy an office space continuously. People come and go to use the copier, get lunch, attend meetings. The space is not used continuously. However, the space could be occupied continuously under normal operating conditions.

## **3. Design**

### **a. Definition**

The regulation requires that a space be designed for human occupancy; it does not require that human occupancy be the primary function of the space.

Pop-up box for: "However, using a vented telecommunications vault as an example, OSHA has described factors that employers may consider in determining whether a space is designed for continuous employee occupancy, such as ventilation ensuring the presence of a normal atmosphere for an occupant to breathe, and working dimensions large enough to allow an adult to work and move around while standing erect. FR 1/14/1993, p. 4478.

### **b. Examples**

Think now of a file storage room in an office building. The space has all the things needed to spend the day there. Light, heating, ventilation. It is designed for people to be there, whether or not the space is used on any regular basis.

## Course Design Plan

The following is an example displaying the elements of the Instructional Performance Requirements Document.

### I. Introduction

1. Project Overview
2. Target Audience
  - Category Descriptions
  - Primary Audience Characteristics
  - Prerequisites
3. Purpose of this Document

### II. Course Structure

1. Description
2. Course Outline
3. Course Flow Chart
4. Estimated Number of Screens and Contact Time

### III. Course Design Strategy

1. Approach
2. Extended Metaphors/Themes
3. Scenarios
4. Plan for Supplemental Materials
5. Role of the Instructor

### IV. Course Assessment Strategy

1. Practice
2. Module Assessments

### V. Module Design Strategy

1. Learning Objectives
2. References
3. Terms Used in Module Design Strategy
4. Introduction to the Course
  - Introduction Outline
  - Introduction Media
5. Module 1: What is Permit-Required Confined Space Entry
  - Terminal Objective (TLO 1)
  - Associated Enabling Objectives
  - Module 1 Outline
6. Module 2: Confined Space
  - Terminal Objective (TLO 2)

- Associated Enabling Objectives
- Module 2 Outline
- 7. Module 3: Permit-Required
  - Terminal Objective (TLO 3)
  - Associated Enabling Objectives
  - Module 3 Outline
- 8. Module 4: Hazards
  - Terminal Objective (TLO 4)
  - Associated Learning Objectives
  - Module 4 Outline
- 9. Module 5: General Requirements
  - Terminal Objective (TLO 5)
  - Associated Learning Objectives
  - Module 5 Outline
- 10. Module 6: Control Methods
  - Terminal Objective (TLO 6)
  - Associated Learning Objectives
  - Module 6 Outline
- 11. Module 7: Testing and Measurement
  - Terminal Objective (TLO 7)
  - Associated Enabling Objectives
  - Module 7 Outline
- 12. Module 8: Permit Space Program
  - Terminal Objective (TLO 8)
  - Associated Enabling Objectives
  - Module 8 Outline
- 13. Module 9: Training Requirements and Employee Roles
  - Terminal Objective (TLO 9)
  - Associated Enabling Objectives
  - Module 9 Outline
- 14. Module 10: Rescue
  - Terminal Objective (TLO 10)
  - Associated Enabling Objectives
  - Module 10 Outline
- 15. VI. Technical Functionality
  - 4. Use of Audio
  - 5. Use of Video
  - 6. Playing Audio, Video and Animations
  - 7. Development Tools
  - 8. Glossary Word Pop-ups
  - 9. OSHA Registration System Functions

10. FAQs and Links

VII. Next Steps

## Evaluation Plan

The following is an example displaying the elements of the Evaluation Plan.

### I. Introduction

1. Overview
2. Evaluation Objectives

### II. Evaluation Methodology

3. Selecting Evaluation Participants
4. Assembling An Evaluation Team
5. Developing Data Collection Protocols
6. Conducting The Evaluation
7. Analyzing The Data And Reporting The Evaluation Results

Appendix A. Participant Profile Form

Appendix B. Pre-and Post-test

Appendix C. Participant Written Summary

Appendix D. Evaluation Agenda

Appendix E. Evaluation Bug List

## Evaluation Report

The following is an example displaying the elements of the Evaluation Report.

### I. Introduction

- 8. Overview
- 9. Evaluation Objectives

### II. Evaluation Methodology

- 10. Evaluation Participants
- 11. Evaluation Team
- 12. Data Collection Protocols
- 13. The Evaluation

### III. Findings

- 14. Participant Demographic Information
- 15. Pre- and Post-test Analysis
- 16. Participant Written Survey Results
- 17. Summary Of Evaluation Team Observations
- 18. Informal Group Discussion Comments
- 19. Summary Of Screen Changes
- 20. Length Of Course

### IV. Recommendations

- Appendix A. Evaluation Plan
- Appendix B. Participant Profile Form
- Appendix C. Pre-and Post-test
- Appendix D. Participant Written Summary
- Appendix E. Evaluation Agenda

## Appendix B. Storyboard Templates

### Storyboard Template (Portrait)

Date:	Storyboard File Name:	Version #
Storyboard Writer:		
Storyboard Reviewer:		Date Comments Received:
Course:	Course #	
Module:	Module #	
Topic:	Topic #	
Screen:	Screen #	

Arial 10 Point		of
Screen Title		

This is the text area.	This is a graphic area. All graphic notes/descriptions go here.
------------------------	---

Arial 10 point	
----------------	--

Programmer Notes:	
Pop-up Text:	
Back:	Forward:
Correct Feedback:	If correct Branch to:
Incorrect Feedback:	If incorrect Branch to:

## Storyboard Template (Landscape)

Date:		Storyboard File Name:		Version #	
Storyboard Writer:					
Storyboard Reviewer:			Date Comments Received:		
Course:				Course #	
Module:				Module #	
Topic:				Topic #	
Screen:				Screen #	

Arial 10 Point	of
----------------	----

Screen Title
--------------

This is a graphic area. All graphic notes/descriptions go here.

This is the text area.

Arial 10 point
----------------

Programmer Notes:			
Pop-up Text:			
Back:		Forward:	
Correct Feedback:		If correct Branch to:	
Incorrect Feedback:		If incorrect Branch to:	

### Storyboard Template (Full Screen)

Date:		Storyboard File Name:		Version #	
Storyboard Writer:					
Storyboard Reviewer:			Date Comments Received:		
Course:		Course #			
Module:		Module #			
Topic:		Topic #			
Screen:		Screen #			

Arial 10 Point		of
Screen Title		
<div style="border: 1px solid black; padding: 10px; min-height: 200px;"> <p>This is the text area.</p> </div>		
Arial 10 point		

Programmer Notes:					
Pop-up Text:					
Back:			Forward:		
Correct Feedback:			If correct Branch to:		
Incorrect Feedback:			If incorrect Branch to:		

## Appendix C. Process Checklists

### Document Review Checklist

Check Design Documents for all elements:

Document Elements	Does the Design Document...	Yes	No
<b>Overview</b>	<ul style="list-style-type: none"> <li>State the purpose of the course?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Describe the overall outcomes to be achieved by the course?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Target Audience</b>	<ul style="list-style-type: none"> <li>Describe the intended audience?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Prerequisites</b>	<ul style="list-style-type: none"> <li>List the prerequisite course or knowledge/skills required before taking the course?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Assessment/ Certification</b>	<ul style="list-style-type: none"> <li>Describe the assessment strategy to be used within the course, including answers to the following questions:               <ul style="list-style-type: none"> <li>➤ Will there be pre-tests? Will they be mandatory?</li> <li>➤ At what point(s) within the course will assessment occur (e.g., at the beginning or end of the course, at the beginning or end of each module)?</li> <li>➤ Is there a required mastery level for passing the course/module? If so, what is that score? What happens to individuals who fail to demonstrate mastery?</li> <li>➤ How many times will the individual be allowed to retake assessments?</li> </ul> </li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Course Map</b>	<ul style="list-style-type: none"> <li>Provide an overview of the layout of the program, such as a diagram or flowchart?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Module Designs</b>	<ul style="list-style-type: none"> <li>Provide the following information for each module within the course:               <ul style="list-style-type: none"> <li>➤ Module Title?</li> <li>➤ Terminal Learning Objective (TLO)?</li> <li>➤ Enabling Learning Objective (ELO) ?</li> <li>➤ Projected Module Length in minutes?</li> <li>➤ Content Outline of Key Topics?</li> <li>➤ Recommended Instructional Strategies incorporated within the module?</li> <li>➤ Media to be used within the module (e.g., text, audio, video) ?</li> </ul> </li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Technical Specifications</b>	<ul style="list-style-type: none"> <li>List any special technical requirements (e.g., specifications for delivery system)?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>

**Check the Instructional Approach**

<b>Approach</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>Methods and Media</b>			
• Will the proposed interactions engage the student?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Does the media mix support the objectives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Does the technical environment (e.g., student's computers, network, or servers) support the proposed methods and media?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Do the proposed methods and media fit within the budget constraints?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Module Length</b>			
• Have the modules been divided into small enough units to allow sufficient breaks for students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Assessment Strategy</b>			
• Does the assessment strategy support the client's overall goals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Is the assessment feasible to implement from a technical standpoint?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Check the Content Flow**

<b>Content</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>
<b>Major Topics</b>			
• Are the major topics sequenced in a way that will be logical to the students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Will it be easy to present the major topics in this sequence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Will the students acquire all prerequisite skills and knowledge if the topics are presented in the sequence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Subtopics</b>			
• Are the subtopics sequenced in a way that will be logical to the students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Will it be easy to present the subtopics in this sequence?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Will the students acquire all prerequisite skills and knowledge if the subtopics are presented in the	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

sequence?			
<b>Size of Topics</b>			
• Are the major topics and subtopics broken into units that are small enough to be mastered by the students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Are the major topics and subtopics broken into units that are large enough to be meaningful to the students?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Are the major topics broken into units that are equal in size and or importance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Consistency</b>			
• Are similar topic areas covered to the same levels of depth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Is there a rationale for treating topics at different levels of depth?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Is consistent wording used?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NOTE: Consistent wording can help the students to see the linkages among topics. Also, consistent wording makes the structure apparent to the students. When the students understand the structure, learning comes more easily.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Content</b>			
• If the students acquire this content, will they be able to achieve the learning objectives?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Is the content accurate and up-to-date?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Storyboard Review Checklist

### Review the Instructional Quality

Storyboard		Yes	No
<b>Content</b>	• Is the content relevant to the objectives?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the content presentation well organized?	<input type="checkbox"/>	<input type="checkbox"/>
	• Does the writing style use short sentences in active voice?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the content at the appropriate level of difficulty?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are new terms and acronyms defined and jargon eliminated from the content?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is an appropriate amount of content present on each screen?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are screen headers/titles used to show the student progress in the module?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are sufficient examples used to demonstrate the points being made?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the content free of racial, ethnic, gender, and other stereotypes?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the content free of typographical and grammatical errors?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Interactions</b>	• Are interactions frequent and meaningful?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are interactions appropriate for students?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are instructions for completing interactions clear?	<input type="checkbox"/>	<input type="checkbox"/>
	• Will students receive feedback after they complete each interaction?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Graphics</b>	• Do the proposed graphics support the content and are they placed consistently on the screen?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are the proposed graphics appropriate for the target audience?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are appropriate file names provided for graphics?	<input type="checkbox"/>	<input type="checkbox"/>

<b>Storyboard</b>		<b>Yes</b>	<b>No</b>
<b>Audio Scripts</b>	<ul style="list-style-type: none"> <li>Is the audio consistent with the text that appears on the screen?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Is the audio written to be easily absorbed by the listener?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Video Scripts</b>	<ul style="list-style-type: none"> <li>Will the video segments hold the students' attention?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Will students identify with the characters and situations shown in the video?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Is narration used to explain points that are not obvious in the visuals?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Do the visual images support the narration?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Is the language used appropriate (i.e., contains minimal jargon and correct vocabulary level) for the target audience?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Learner Control &amp; Navigation</b>	<ul style="list-style-type: none"> <li>Do the menus and module structures provide sufficient options to allow students to choose the parts of the module that they need to review?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Will students be able to understand how to navigate through the modules?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Programming Instructions</b>	<ul style="list-style-type: none"> <li>Do the branching logic and other programming instructions correctly reflect the different pathways students can take through the modules?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>

**Review the Technical Accuracy (Completed by the Subject-Matter Expert)**

<b>Storyboard</b>		<b>Yes</b>	<b>No</b>
<b>Content (Text, Audio Script, &amp; Video Script)</b>	• Is the content current and accurate?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the content thorough, given the scope of the module/course objectives?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are examples accurate?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are references accurate?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Interactions (Exercises)</b>	• Are the alternative choices for students to select in the interactions feasible?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the feedback provided to the students after they select an alternative accurate and does it explain why the alternative is correct or incorrect?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Graphics</b>	• Do the proposed graphics represent the content accurately?	<input type="checkbox"/>	<input type="checkbox"/>

### Assessment Item Review Checklist

Questions		Yes	No
<b>Assessment Design &amp; Construction</b>	<ul style="list-style-type: none"> <li>Are the level of difficulty and types of questions consistent with the learning objectives being measured?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Do the assessment items measure the learning objectives and content in the module?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Have subject-matter experts reviewed the assessment items?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Has the assessment been tested with a group of students or others in a paper and pencil format?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are the instructions on how to take the assessment clear?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Have assessment scores been compared with other performance measures (e.g., performance assessments, supervisor ratings, etc.) to determine if they match?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>General Assessment Items</b>	<ul style="list-style-type: none"> <li>Are assessment items worded as clearly as possible?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are clear and simple sentences used?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Is all of the information needed to make a correct response presented during the training session?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are irrelevant clues to the correct response eliminated from the questions?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Would all subject-matter experts select the same correct response?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Does each item have only one correct answer?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Multiple-Choice Assessment Items</b>	<ul style="list-style-type: none"> <li>Is a direct question or an incomplete statement used as an item stem?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are negatively stated stems avoided (e.g., which of the following statements is not true.)?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are all possible responses (distractors) plausible and attractive to students?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"> <li>Are all the responses written as concisely as possible, and in equal length to the others?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>

	<ul style="list-style-type: none"><li>• Has a pattern for correct responses been avoided?</li></ul>	<input type="checkbox"/>	<input type="checkbox"/>
	<ul style="list-style-type: none"><li>• Are the responses arranged in logical order (e.g., in a logical number or time sequence)?</li></ul>	<input type="checkbox"/>	<input type="checkbox"/>

## Course Review Checklist

Questions		Yes	No
<b>Appearance</b>	• Is screen space used effectively in a pleasing and uncluttered format?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are graphics relevant to the text and audio associated with the screen?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is text positioned correctly (not right justified)?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is body text presented as standard upper and lower case (never all CAPS)?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is text easy to read against the background color?	<input type="checkbox"/>	<input type="checkbox"/>
	• Do blank lines separate paragraphs?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are highlighting effects (color, bolding, sound) used effectively to draw attention to pertinent information without being distracting?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is animation used only to support the content?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is color used consistently throughout the module?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are titles consistent throughout the module?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are the screen format and placement of graphics consistent throughout the module?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Functionality</b>	• Do all buttons and interactions perform as expected?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are instructions on how to respond or proceed clear?	<input type="checkbox"/>	<input type="checkbox"/>
	• Does audio and video operate smoothly?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are reply options available for all audio and video elements?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is a text version provided on the screen or as an optional popup window for all audio and video elements?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is the correct feedback provided for each selection?	<input type="checkbox"/>	<input type="checkbox"/>
<b>Interactions and Assessments</b>	• Are interactions and assessments easy to complete without requiring unnecessary mouse clicks?	<input type="checkbox"/>	<input type="checkbox"/>
	• Are interactions stated clearly and function as described in the instructions?	<input type="checkbox"/>	<input type="checkbox"/>
	• Does scoring function correctly and is feedback displayed?	<input type="checkbox"/>	<input type="checkbox"/>
	• Is remediation provided for incorrect responses?	<input type="checkbox"/>	<input type="checkbox"/>



## Appendix D. Glossary

### **Distracters**

Distracters are the incorrect responses provided in a multiple choice question.

### **Embedded Practice**

Embedded practice items are practice questions inserted within a sequence of content screens. They are typically inserted after every 3 to 5 screens.

### **Enabling Learning Objective (ELO)**

ELOs, also known as subordinate objectives, correspond to the skills that are required to accomplish the TLO. Specifically, they define the skills, knowledge, or behaviors that learners must master to successfully achieve the TLO. (See Terminal Learning Objective.)

### **First Responder Community**

The first responder community refers to those personnel trained to respond to incidents involving WMD. These personnel comprise the following disciplines: Emergency Management Agencies, Emergency Medical Services, Firefighters, Government Administrative, Hazardous Materials Personnel, Law Enforcement, Public Health, Healthcare, Public Safety Communications, and Public Works.

### **Instructional Systems Design (ISD)**

ISD is the systematic process of translating principles of learning and instruction into plans for instructional materials and activities. The instructional design process is usually comprised of five steps: Analysis, Design, Development, Implementation, and Evaluation.

### **Module Assessment**

A Module Assessment is a list of questions learners must answer upon completion of each module to measure their knowledge of module content. This is accessible from the module topic menu and consists of a minimum of one question per ELO. A Module Assessment may include:

- Multiple Choice items
- Multiple-Multiple Choice items
- Matching items
- Case Study items

### **Learning Objectives**

Learning objectives inform learners of what they can expect to learn as a result of instruction.

### **ODP Training Partners**

ODP Training Partners refers to those institutions responsible for designing and developing courses for the First Responder Community.

**Office of Domestic Preparedness**

The Office for Domestic Preparedness (ODP) (formerly The Office for State & Local Domestic Preparedness) is the program office within the Department of Justice (DOJ) responsible for enhancing the capacity of state and local jurisdictions to respond to, and mitigate the consequences of, incidents of domestic terrorism.

**Pre-test**

A Pre-test is a list of questions presented to learners enabling them to assess their knowledge about the course content or to "test-out" of specific modules within the course. Pre-test questions are similar to questions presented in Module Assessments, and correspond to the objectives presented in the different modules.

**Remediation**

Remediation provides appropriate content to learners who incorrectly answer Module Assessment questions. For each incorrectly answered question, learners are provided with a review of the corresponding course material to help clarify the question missed and to ensure they master the objective being measured.

**Stem**

The stem is statement or question that requires the user to select an appropriate response.

**Storyboards**

Storyboards are textual and visual descriptions of content, to include graphics, animations and other media elements. They are developed for electronic distribution to programmers and graphic artists for online, computer-based, or Web-based development.

**Terminal Learning Objective (TLO)**

TLOs are objectives that correspond to the overall instructional goals of the course. TLOs describe what learners will be able to do at the end of the overall instructional course.

**Video Teletraining (VTT)**

VTT is live instruction conveyed synchronously by satellite consisting of one-way video (instructor) and two way audio (learners and instructor).

**WBT Prototype**

A WBT prototype is a set of screens designed to represent the proposed look, feel, and functionality of the final product.

**Web-based Training (WBT)**

WBT is a form of computer-based training in which the training material resides on Web pages accessible via the World Wide Web (WWW). Typical media elements used are text and graphics. Other media such as animation, audio, and video can be used, but require more bandwidth and in some cases additional software. The terms "on-line courses" and "Web-based instruction" are sometimes used interchangeably with WBT.

**World Wide Web (WWW)**

The WWW is a hypertext-based, distributed information system originally created by researchers at CERN, the European Laboratory for Particle Physics, to facilitate sharing research information. The Web presents the user with documents, called Web pages, full of links to other documents or information systems. Selecting one of these links, the user can access more information about a particular topic. Web pages include text as well as multimedia (e.g., images, video, animation, and sound). Servers are connected to the Internet to allow users to traverse (or "surf") the Web using a Web browser.